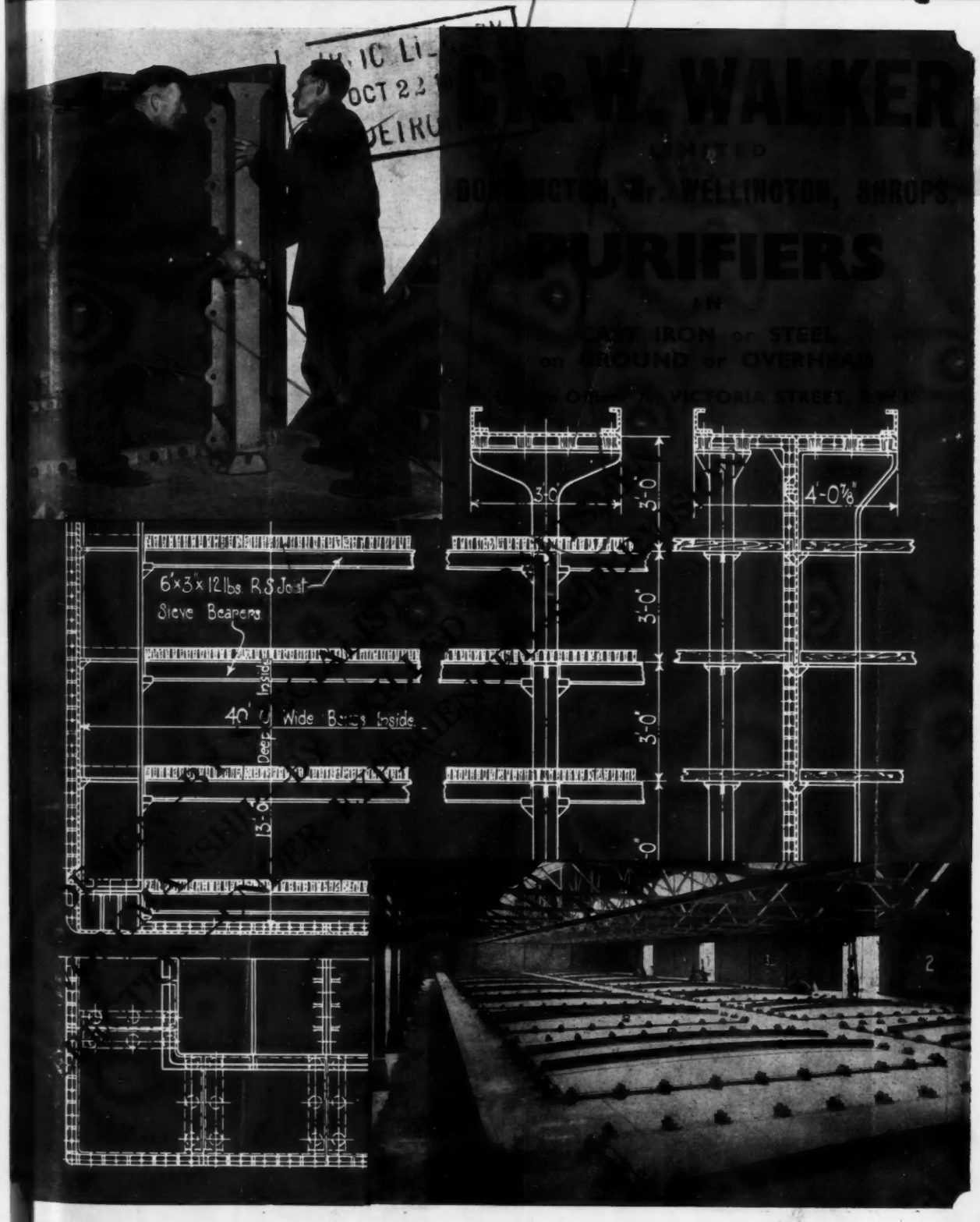
Tech.

Gas Journal

VOL. 284. 107th YEAR. LONDON, OCTOBER 5, 1955. Nº 4818. PRICE 1/6

CHNOLOGY DEPT



VR v.284 O-II'55

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for the GAS INDUSTRY

Long years of experience enable us to offer a complete range of lubricants of the highest quality.

TECHNICAL SERVICES INCLUDE:—

Comprehensive Lubrication Surveys by Expert Lubrication Engineers and Chemists—without obligation.

Contracts on a Thermal Output Basis are available
Consult the leading suppliers to the Industry

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CENTURY WORKS · HANLEY · STAFFS.

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Contractors to the British Government, Crown Colonies, British Railways, National Coal Board, Area Gas Boards, Road Transport Executive, &c.

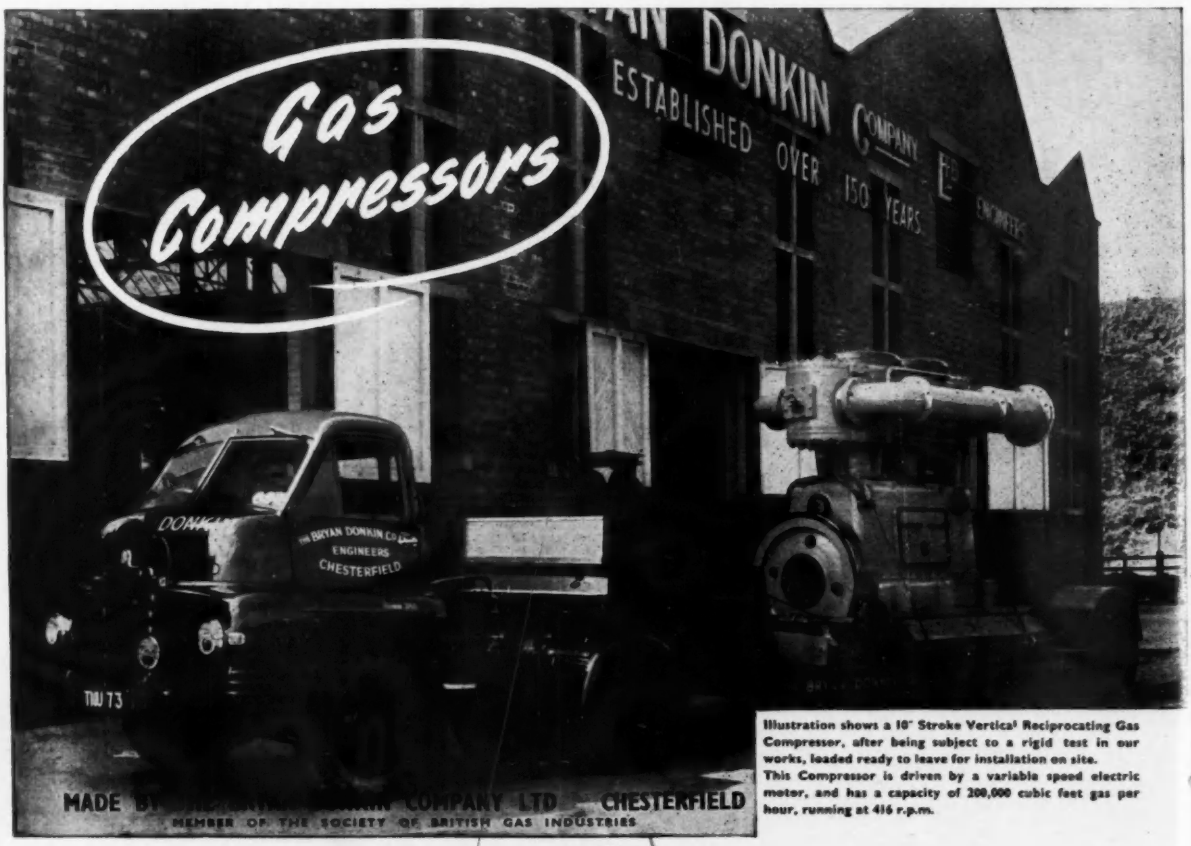
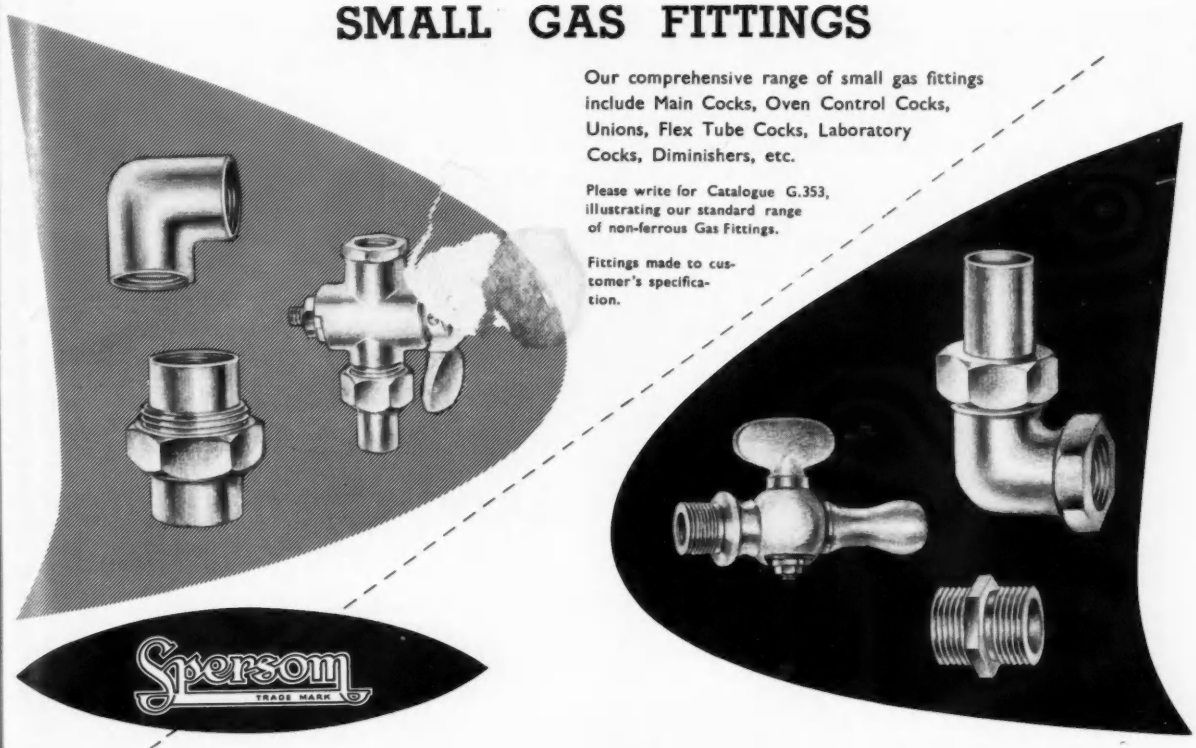


Illustration shows a 10" Stroke Vertical Reciprocating Gas Compressor, after being subject to a rigid test in our works, loaded ready to leave for installation on site. This Compressor is driven by a variable speed electric motor, and has a capacity of 200,000 cubic feet gas per hour, running at 416 r.p.m.

Tech

SMALL GAS FITTINGS



Our comprehensive range of small gas fittings include Main Cocks, Oven Control Cocks, Unions, Flex Tube Cocks, Laboratory Cocks, Diminishers, etc.

Please write for Catalogue G.353, illustrating our standard range of non-ferrous Gas Fittings.

Fittings made to customer's specification.

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GAS METERS

TEST METERS

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Branch works

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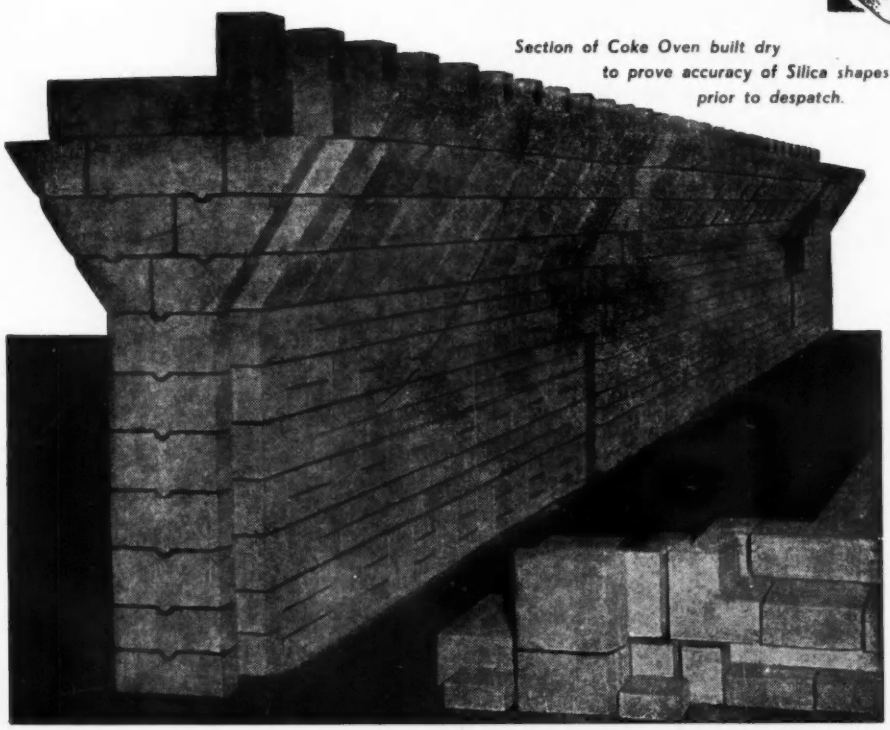
Product of Radiation Ltd

CONSETT

HIGH GRADE REFRACTORIES FOR COKE OVENS, GAS WORKS, ETC.

SILICA BRICKS, SHAPES and CEMENTS
SPECIAL NON-SPALLING HIGH-ALUMINA MATERIALS FOR DOOR JAMBS and BOTTOM SECTIONS OF VERTICAL RETORTS

Our Technical Department is always available for consultations on recent developments.



Section of Coke Oven built dry to prove accuracy of Silica shapes prior to despatch.

IT PAYS TO USE CONSETT REFRACTORIES

CONSETT IRON COMPANY LIMITED
CONSETT · CO. DURHAM · ENGLAND
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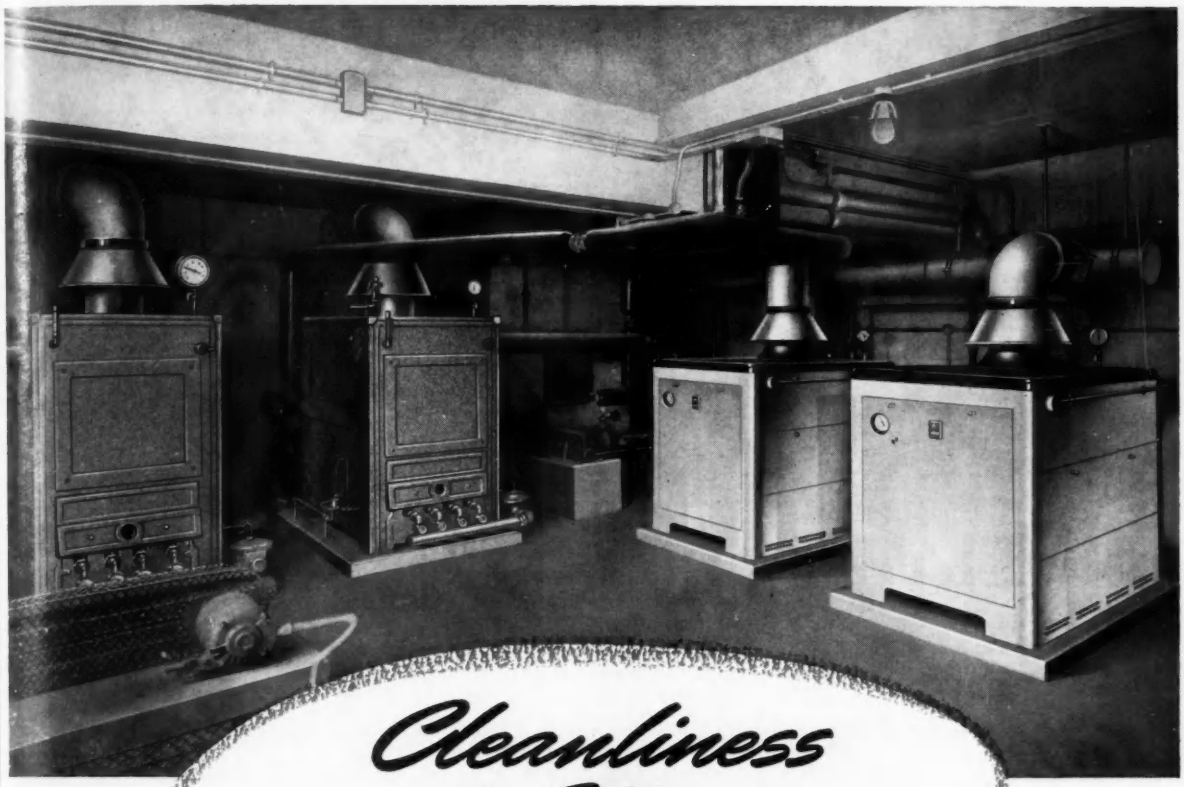


Cleanliness and Efficiency

Illustrated above are Ideal Gas Boilers installed, for central heating and indirect hot water supply, in the new extension of the Mount Vernon Hospital, Northwood, Middlesex.

Cleanliness and a healthy atmosphere are essential to a hospital, and it is therefore important that the heating boilers are fired with a smokeless fuel. In such circumstances, no better choice can be made than Ideal gas-fired boilers. Many years of research work and experience have resulted in the present satisfactory designs.

Ideal Gas Boilers are equipped with complete thermostatic controls, have insulated jackets of steel or aluminium in appropriate finishes and are available in 22 sizes from 20,000 to 1,430,000 B.T.U.'s per hour.

IDEAL Gas Boilers

IDEAL-Standard

Foremost for heating and sanitary equipment

IDEAL BOILERS & RADIATORS LIMITED · IDEAL WORKS · HULL

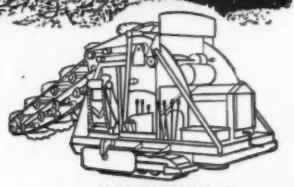
315

12/21 MODEL FOR NARROW TRENCHES

The answer to all your trenching problems

ALLEN *Super Duty* TRENCHERS

For narrow trenches we supply the 12/21 model, and for wide trenches the 16/60 model. Both models are a fine engineering job and capable of standing up to continuous hard work. We shall be pleased to send you further information and fully illustrated brochures on request.



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Steel Bunkers and Chimneys at Power Stations and Works are usually lined with GUNITE which withstands abrasion and chemical attack without adding seriously to the weight.

GUNITE

puts longer life into Bunkers

The Gunite process, developed by the Cementation Co., Ltd., has a successful record of over 25 years as a facing for both new and dilapidated structures.

It is water, weather, and fireproof, and has great mechanical strength and hardness. Its adhesion to concrete is greater than the strength of the concrete itself.

Write for your copy of the Gunite booklet which illustrates and describes its characteristics and applications for factories, chimneys, wharves, water towers, reservoirs, sea walls, silos, etc.

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The latest Electrolux GAS REFRIGERATOR

. . . sized and priced for the majority of homes

She was quite right to *open the door!* How else can people see the two useful door shelves and the other well planned storage arrangements? Built for long, dependable *silent* service, the latest Electrolux Gas Refrigerator offers so much at a family man's price.

- **Shelf area 5 sq. ft. Adjustable shelves.**
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- **Flexible 'quick-releaser' of ice cubes.**
- **Three transparent plastic, food containers.**
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- **Cooling unit guaranteed for 5 years.**

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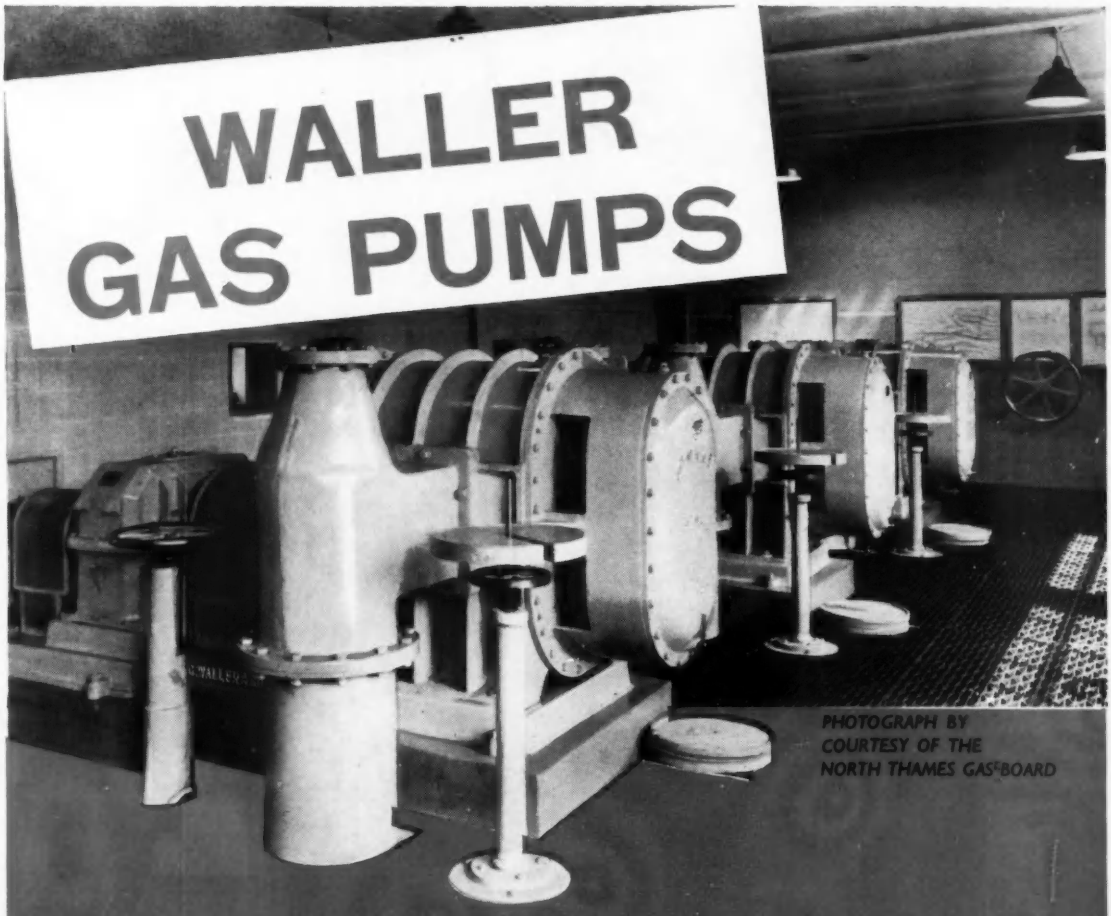
WALLER GAS PUMPS



PHOTOGRAPH BY COURTESY OF THE NORTH THAMES GAS BOARD

What's in a name — Gas Pump, Booster or Blower they all do the same job and the name does not matter.

But the makers of such machines do matter and that is why Waller Gas Pumps are so often installed.

GEORGE **WALLER** & SON LTD.

PHOENIX IRON WORKS • STROUD • GLOS.

Telephone Brimscombe 2301/2

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES

NOW!

.. every coat *positively* rust-inhibiting !

BETTER PROTECTION..LONGER LIFE..LOWER UPKEEP COSTS!

These desirable features are now a reality for you!

Atlas now offers you a new range of Undercoats which not only give "build" to the ultimate paint film, but which are themselves positively rust-inhibiting! Their corrosion resistance has been proved by laboratory tests and prolonged exposure trials. Now, every coat . . . Primer, **UNDERCOAT** and Finish . . . is positively rust-inhibiting, each adding its quota to the formation of a tough, durable paint film!

● Send now for colour card and particulars of these money savers!

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The Paints of Stamina

IRON & STEEL *PRESERVATIVE* PAINTS

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TAS/AS.117

Protection in Gas Production

Humidine
non-setting paint

Used by

Almost every major gas undertaking in the U.K.

Used on

Lower lift plates and cuppings, purifier lutes, governor bells, meter drums and wherever metal is not in physical contact.

Used because

One coat forms an impenetrable permanent barrier against corrosion.

Humidine never dries — therefore it never cracks or needs renewal. Impervious to moisture—can be applied under water.

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50 YEARS SERVICE
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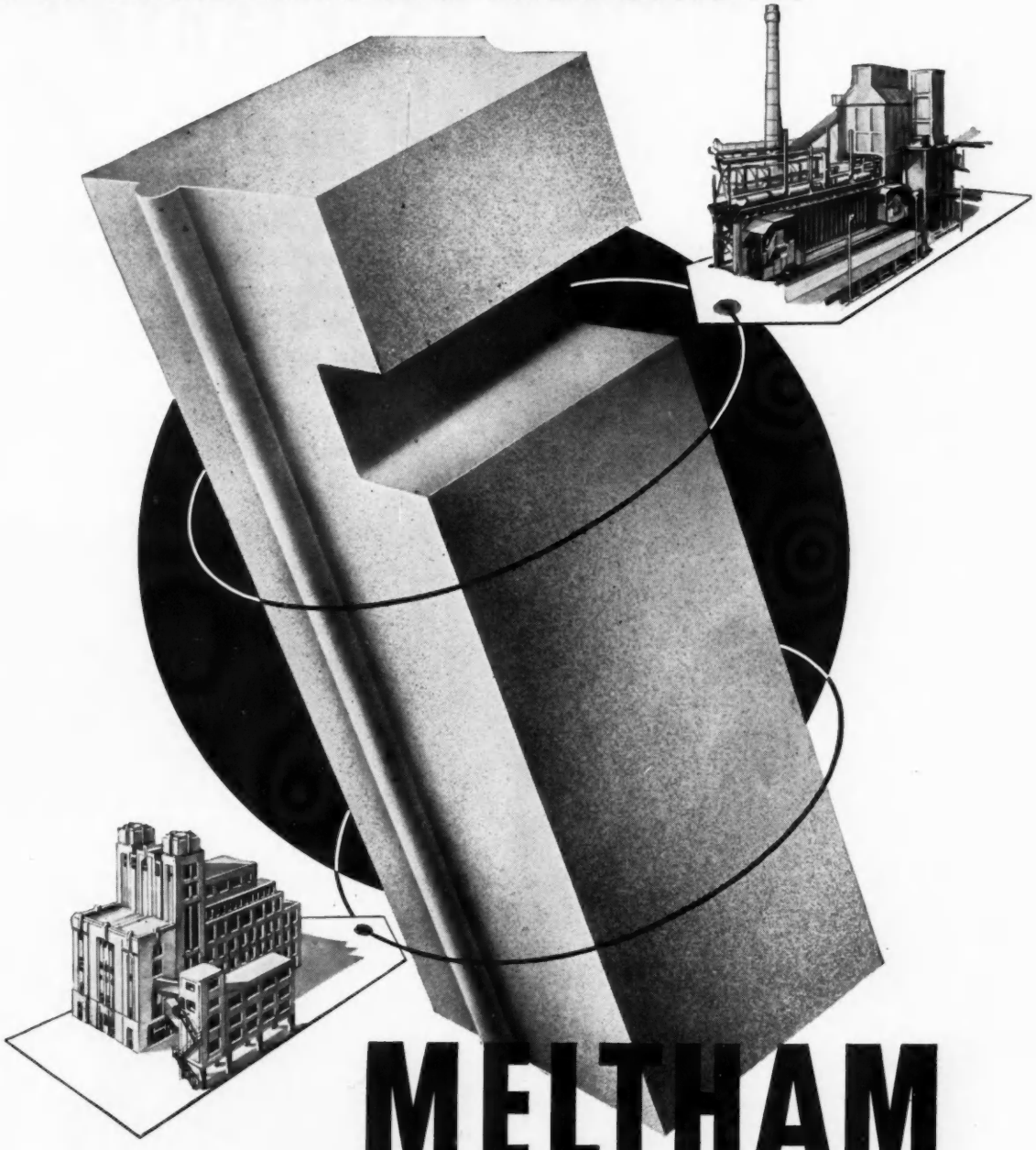

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LOW THERMAL EXPANSION · TRUE TO SHAPE AND SIZE
HIGH RESISTANCE TO ABRASION · FIRST CLASS FINISH

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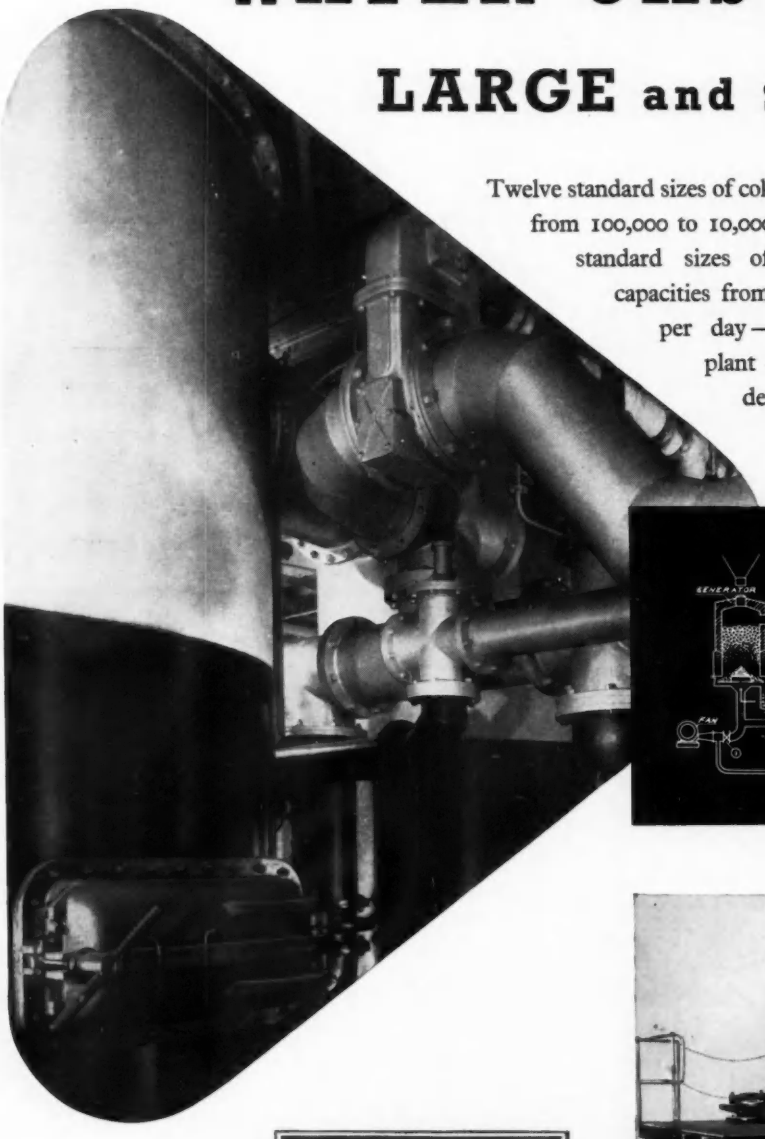
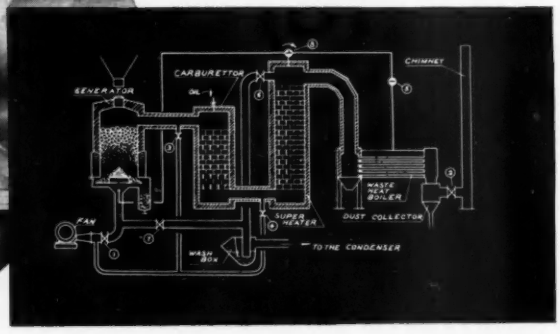
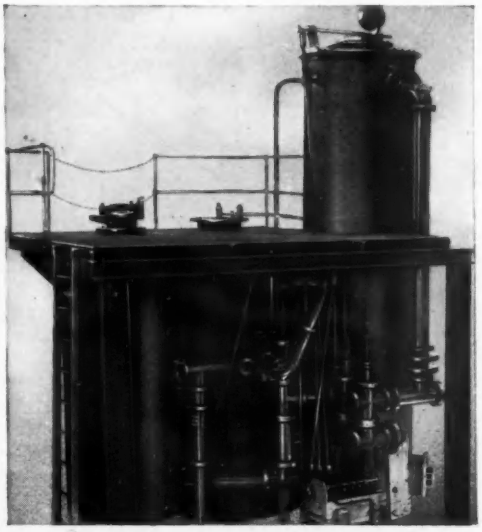
Balfours build WATER GAS plants

LARGE and small

Twelve standard sizes of coke water gas plants with capacities from 100,000 to 10,000,000 cubic feet per day — eight standard sizes of coal water gas plants with capacities from 50,000 to 2,000,000 cubic feet per day — in fact a complete range of plant sizes, have been designed and developed by Balfours to meet all requirements.







Balfour OF LEVEN

HENRY BALFOUR & CO. LTD.

Artillery House, Westminster, London, and Durie Foundry, Leven, Fife

A MEMBER OF THE BALFOUR GROUP OF COMPANIES

A National Service

THE work that William Press & Son carry out all over the country is infinitely varied and calls for proved experience and versatile ability. One job may involve excavating Cornish granite, another the laying of a 12 in. main in shillet, while elsewhere a 30 in. main has to be laid under a railway line. Everywhere the most up-to-date methods are employed to ensure the perfect laying of gas mains and a completely satisfactory distribution of gas to the community.

William Press & Son Ltd.

42 Years' Service to the Gas Industry.

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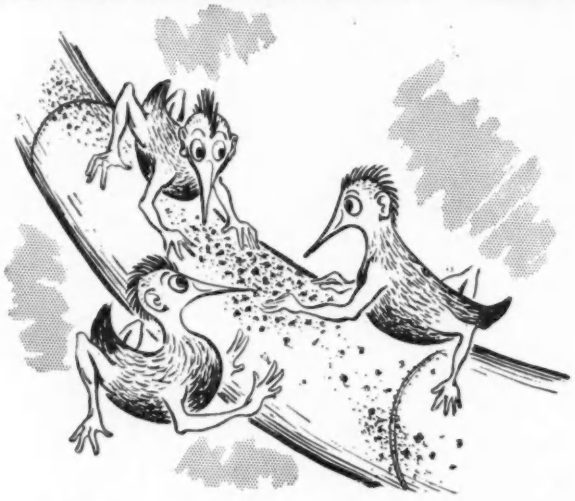
CORROSION DEFEATED by CATHODIC PROTECTION



Those Gremlins, which are always haunting engineers in one form or another, are insistently corroding buried iron and steel (pecking away year after year externally and sometimes internally).

MAPEL defeats corrosion by the well-proved method of Cathodic Protection which can be maintained effectively at little cost for the whole life of the protected structure.

Consult MAPEL for protection of buried pipelines and other steel structures including concrete reinforcement—protection of steel jetties and steel piling—prevention of external and internal corrosion of oil tankers, cargo steamers, barges and steel tanks—prevention of internal corrosion of condensers.

The MAPEL Service is comprehensive, including Surveys, Design, Specification of Equipment (using either magnesium or impressed current), supply of materials and verification of the complete protection.

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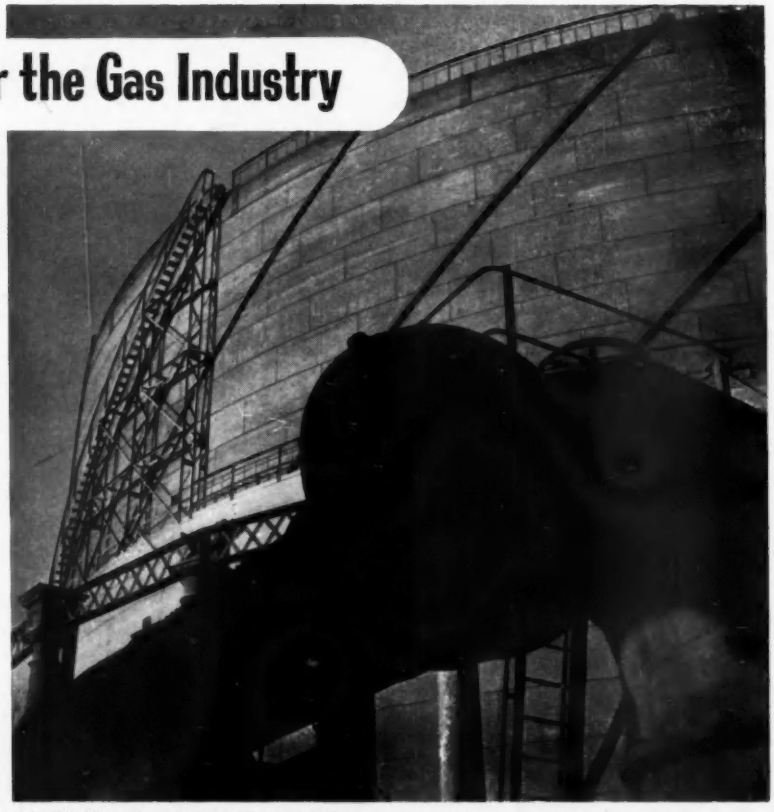
Canadian Agent: **Ross-Meagher Ltd., 9 Echo Drive, Ottawa 1, Ontario, Canada**

Photograph by courtesy of the Gas Council

Aluminium Paints for the Gas Industry



"LUMEROS X" High Heat Resisting Paint.
Represents the latest and greatest advances in the protection of iron and steel subject to very high temperatures. "LUMEROS X" gives adequate protection at temperatures up to 600°C. Good water resistance. No undercoat required. Available in Aluminium or Black.

"METTAL" Aluminium Paint.
A general purpose paint of the highest quality and durability and possessing great brilliance. For indoor and outdoor use. Whilst not specifically designed as a heat resisting coating "METTAL" will stand temperatures around 212°F (100°C).

"METTAL" (Thermal).
Specifically designed for indoor and outdoor use on metal surfaces up to 350° F (177°C).

BRITISH PAINTS LIMITED

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7 points that count...

★ EXCELLENT COOKING ASSURED
★ DESIGNED FOR MAXIMUM EFFICIENCY
★ ECONOMIC IN SERVICE
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★ SAFETY TYPE GAS TAPS
★ LARGE OVEN CAPACITY WITH "AUTOKOOK" HEAT CONTROL
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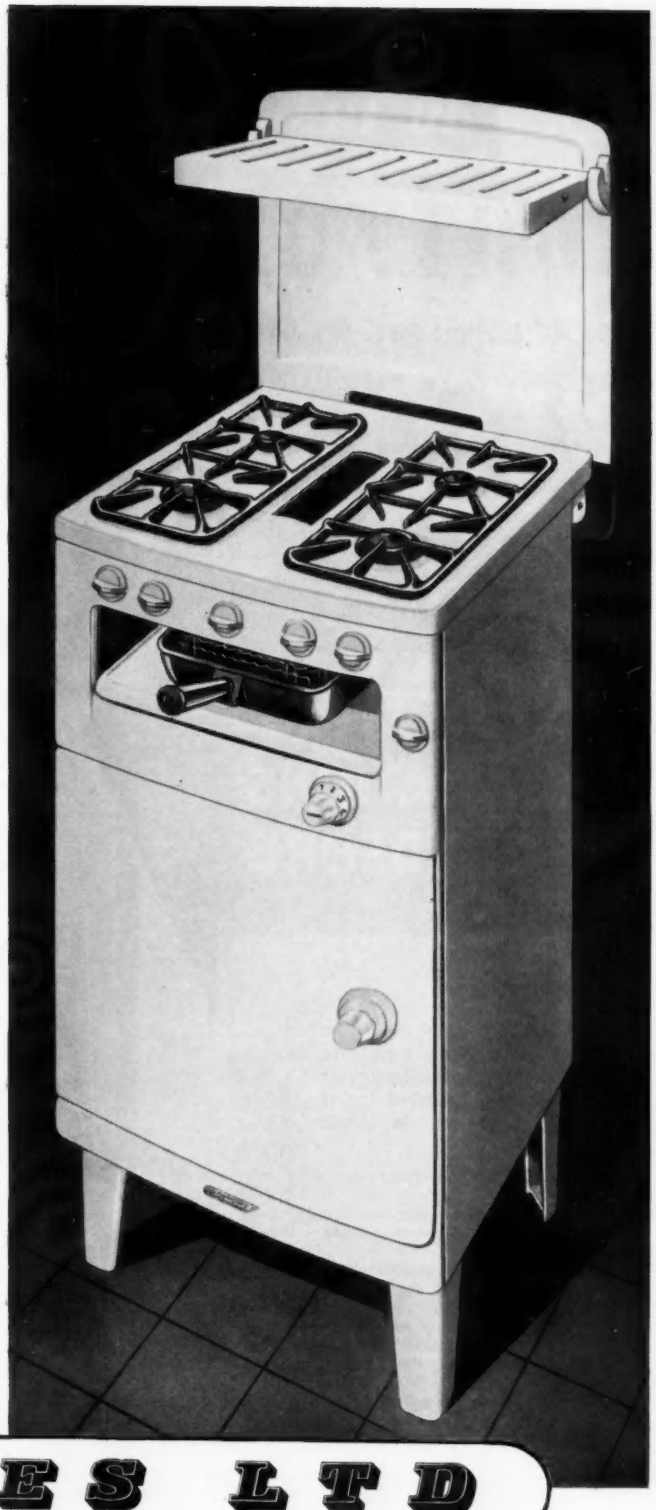

THE NEWHOME

X2

MODERN GAS COOKER

STOVES LTD

RAINHILL · LIVERPOOL

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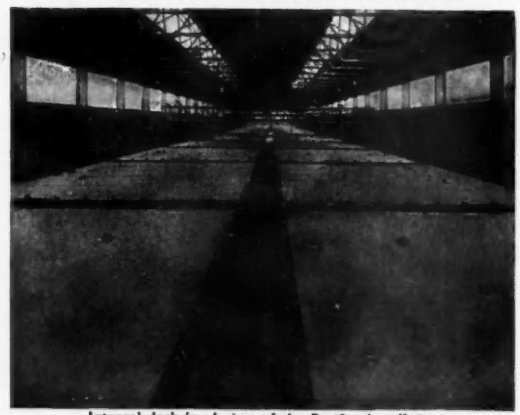
RECENT CLAPHAM INSTALLATIONS AT BRADFORD

For over 100 years we have been serving the Gas Industry and the illustrations show equipment recently installed for the North Eastern Gas Board at Birkshall Works, Bradford.

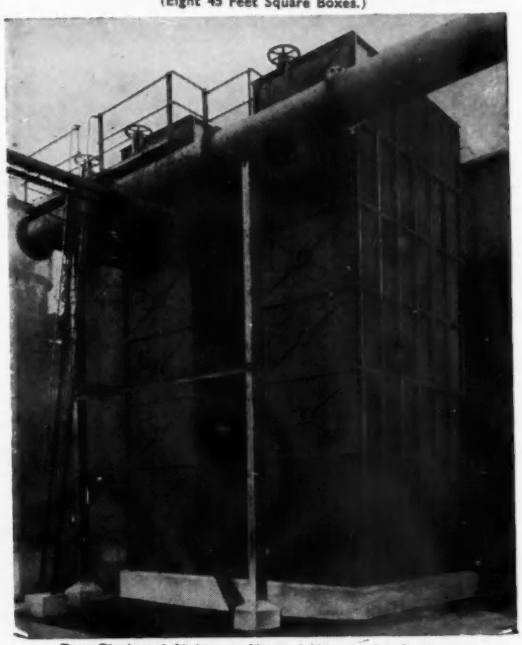
Manufacturers of

- Condensing Plant
- Tar Extractors
- Washers (Pumpless Patent)
- Oxide Purification Plant
- Boxless Purifiers (Prov. Pat.)
- Liquid Purification Plant
- Mechanical Handling Plant
- Coke and Pan Ash Washers
- Purifier Control Valves
- Gas Pre-Heaters
- Briquetting Plants
- Refractory Brick Making Plant
- Special Pipes and Connections in cast iron and steel

Two Clapham-Barwick Pumpless Static Ammonia Washers



Internal deck level view of the Purifier Installation. (Eight 45 Feet Square Boxes.)



Two Claphams' Multi-pass Vertical Water-tube Condensers.

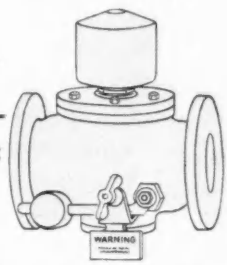
CLAPHAM BROS. LIMITED
MAKERS OF GAS WORKS EQUIPMENT SINCE 1837
KEIGHLEY · YORKS Tel: 2787-2788-Grams: 'Clapham Bros. Keighley'

ON THE SUBJECT OF CONTROL

-we're happy to share our knowledge!

For we have accumulated quite a store of knowledge in over 25 years as valve manufacturers. Magnetic Valves can help you in your control problem, automatic or remote, for air, oil, steam, coal gas, and many other industrial liquids and gases. And the way Magnetic Valves do it, glands, stuffing-boxes, and driving-shafts are unnecessary. Let us share our knowledge by sending you our illustrated literature, containing details of all Magnetic Valves up to 12 inch orifice.

SPECIAL VALVES DESIGNED *if required*
STANDARD VALVES DELIVERED *ex stock*



THE MAGNETIC SAFETY CUT-OUT GAS VALVE

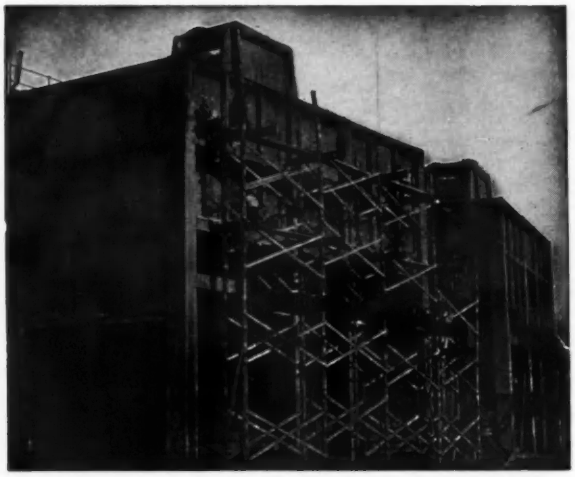
The Magnetic Safety Cut-out Gas Valve is of the semi-automatic hand opening electrically maintained pattern, ensuring instantaneous and complete closure in the event of current interruption. The valve is of "packless" construction, and can be supplied in sizes ranging from ¼" up to and including 12".
Alternative types of hand operating gear are available including hand lever, weight return, and push-up spring return patterns.
The installation of this valve is an essential precaution with all types of gas fired equipment and ensures complete isolation of the gas supply in the event of an interruption of the electrical supply WITHOUT automatic opening when such electrical supply is restored.

The magnetic valve co. LIMITED

28 ST. JAMES'S PLACE, LONDON, S.W.1.

***Telephone:* HYDe Park 7588**

Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

96, VICTORIA STREET, S.W.1
Telephone : Victoria 7877 & 6275

THE CONCRETE PROOFING CO., LTD.

Handbook " GUNITE " sent on request

NO FLAME

Protectoglo Flame Electrode and Control Relay

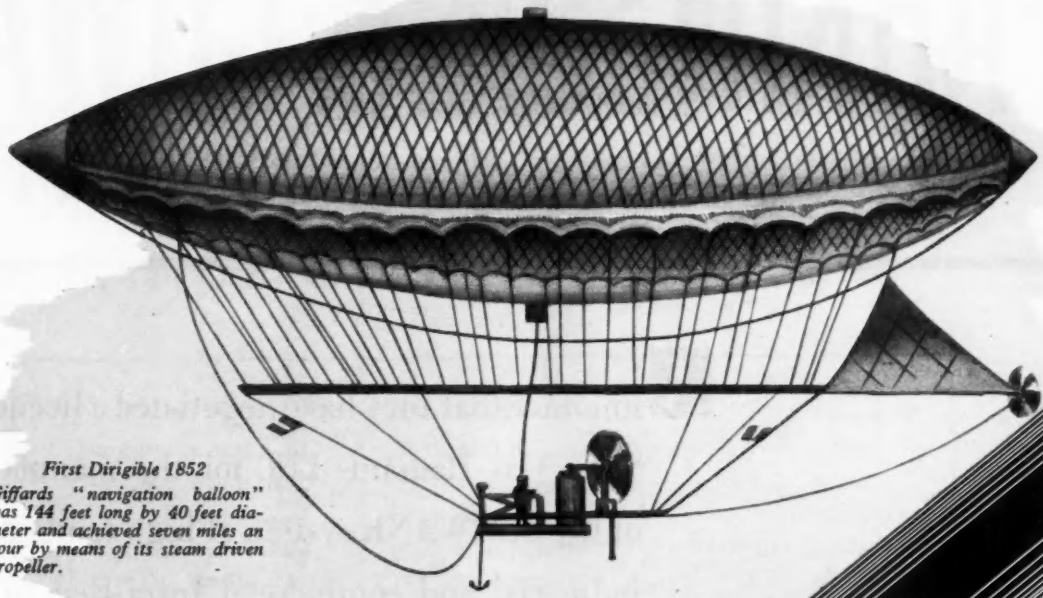
NO FUEL FLOW

and therefore NO DANGER OF EXPLOSION because the PROTECTOGLO Combustion Safeguard System gives instantaneous automatic protection to workers and plant.

Designed to stop INSTANTANEOUSLY the flow of gas to a burner in case of flame failure, and to give CONTINUOUS PROTECTION AGAINST GROUNDING OF THE FLAME ELECTRODE, the Honeywell-Brown Protectoglo Combustion Safeguard System is installed on gas-fired furnaces, kilns, ovens, lehrs, etc. throughout the country. Push-button control, electric ignition, and flexibility of design to permit incorporation of temperature or limit controls if required, are some of its outstanding features. Please write for details of an installation to suit your particular requirements. Honeywell-Brown Ltd., 1 Wadsworth Road, Perivale, Greenford, Middlesex. *Sales Offices located in the principal cities of Britain and throughout Europe.*

Honeywell
BROWN INSTRUMENTS
First in Controls

From the Earliest Days.....



First Dirigible 1852
Giffards "navigation balloon" was 144 feet long by 40 feet diameter and achieved seven miles an hour by means of its steam driven propeller.

Pioneers in the making of Cast Iron pipes for gas mains for over a hundred years—Staveley has kept in step with the ever growing Gas Industry and its mains distribution network.

The famous Staveley flexible-joints allow up to four degrees of movement and are standard with most Gas Authorities the world over.

STAVELEY

SAND & METAL SPUN PIPES

for **GAS MAINS**

THE STAVELEY IRON & CHEMICAL CO. LTD. NR. CHESTERFIELD

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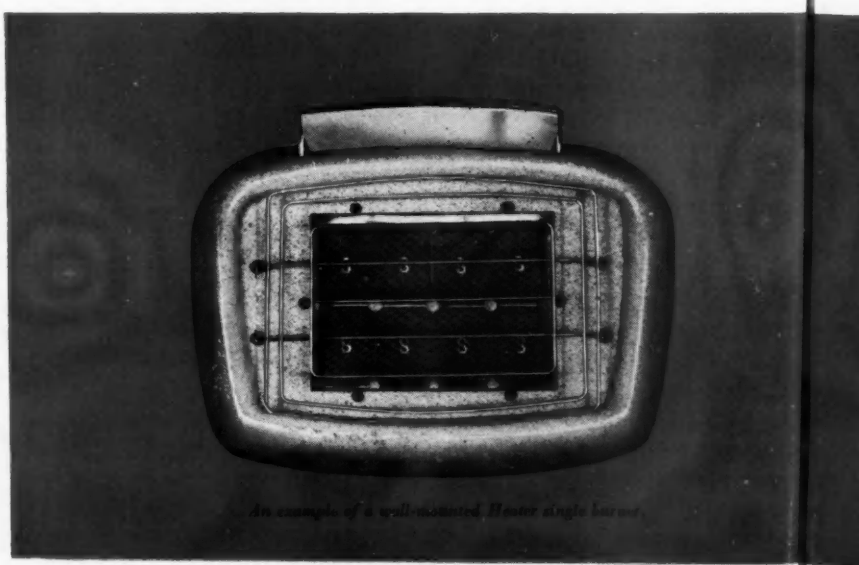
PARKINSON & COWAN

INDUSTRIAL PRODUCTS

Announce that they have negotiated a licence via Siaps Gas-Radiants Ltd. for the manufacture of the SCHWANK system of high temperature industrial and commercial Infra-Red radiant space heating units and industrial processing equipment. Patent No. 700559.



An example of a well-mounted Heater single burner.

PARKINSON & COWAN INDUSTRIAL PRODUCTS (A Division of Parkinson & Cowan

RANGE OF SPACE HEATERS

TYPE		GAS RATE (500 C.V.)	B.T.H.U/HR
WM.1X	Wall Mounted	25 cu. ft. per hr.	12,500
WM.2X	Wall Mounted	50 cu. ft. per hr.	25,000
WM.1S	Wall Mounted	25 cu. ft. per hr.	12,500
WM.2S	Wall Mounted	50 cu. ft. per hr.	25,000
H.1	Horizontal Fixing	25 cu. ft. per hr.	12,500
H.2	Horizontal Fixing	50 cu. ft. per hr.	25,000
H.3	Horizontal Fixing	75 cu. ft. per hr.	37,500
H.4	Horizontal Fixing	100 cu. ft. per hr.	50,000
H.6	Horizontal Fixing	150 cu. ft. per hr.	75,000
H.248	Horizontal Fixing	200 cu. ft. per hr.	100,000
H.2612	Horizontal Fixing	300 cu. ft. per hr.	150,000

INDUSTRIAL PROCESSING APPLICATIONS

The Industrial processing applications utilising the Schwank Patent Burner are far too numerous to list. The illustration is but one example of the burner incorporated in one of our existing Infra Red units and being used for label and bottle drying.

'DEPT. Q' · COTTAGE LANE · CITY ROAD · LONDON · EC1 · TELEPHONE CLERKENWELL 1766/7

6 outstanding advantages of the EWART M75

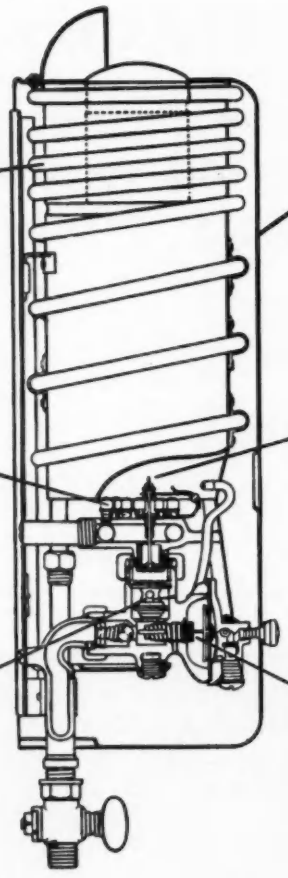
INSTANTANEOUS GAS WATER HEATER

DOUBLE PURPOSE • SINGLE POINT OR MULTIPOINT

Heating coil is in one piece: no joints so no leaks. Single stage heat exchanger has widely spaced fins so that flueways are kept clear and efficiency maintained over long periods.

Bray type steatite-tipped burners have an exceptionally long service life. They do not corrode and are not susceptible to blockage.

Built-in automatic gas (volume) governor prevents over-gassing and thereby prolongs life of heating unit and reduces maintenance cost.



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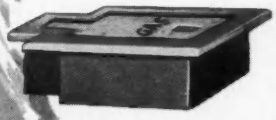

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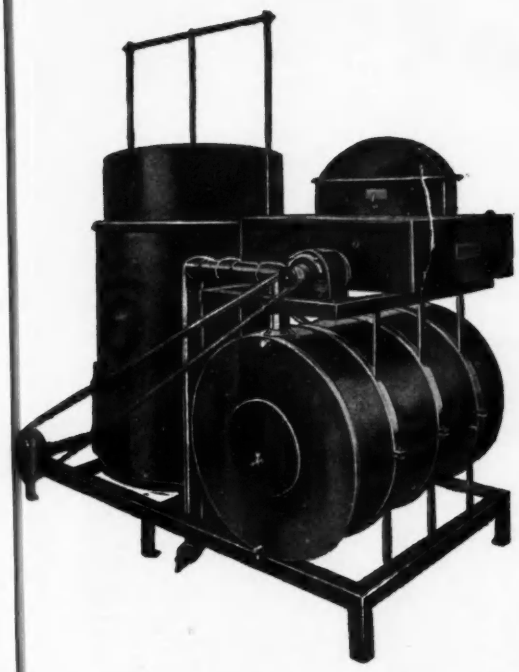

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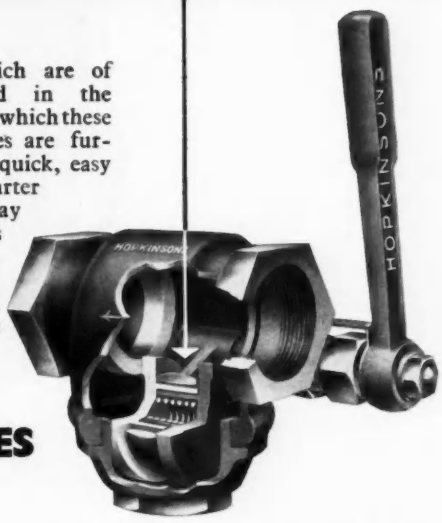

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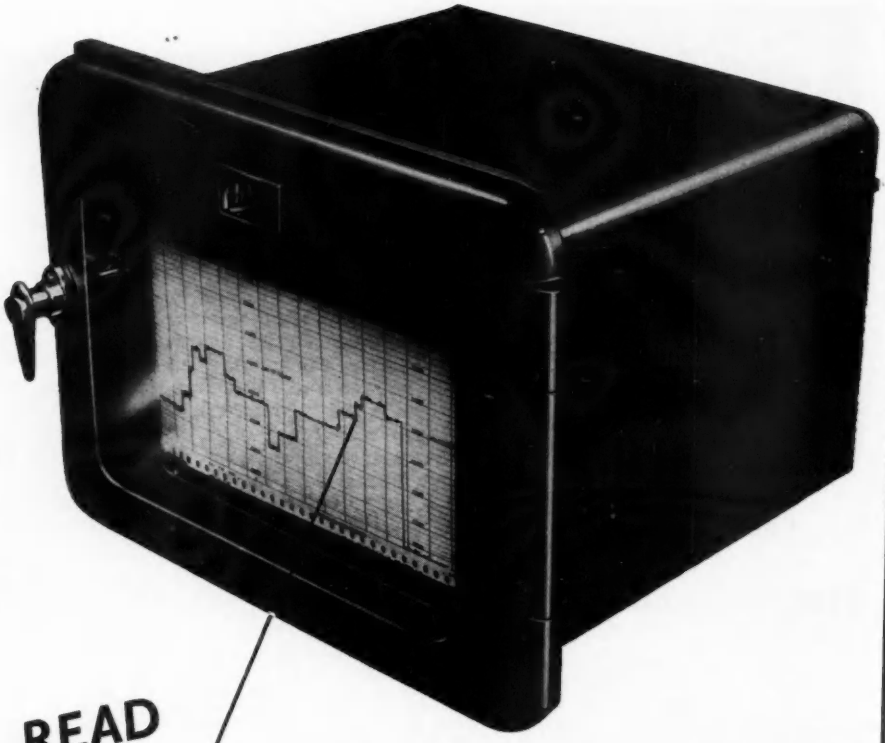

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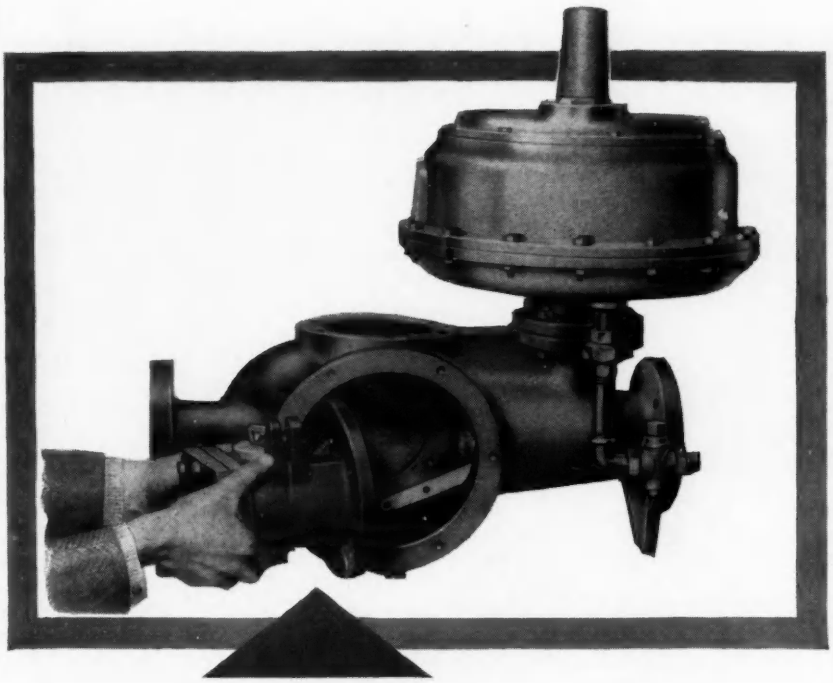

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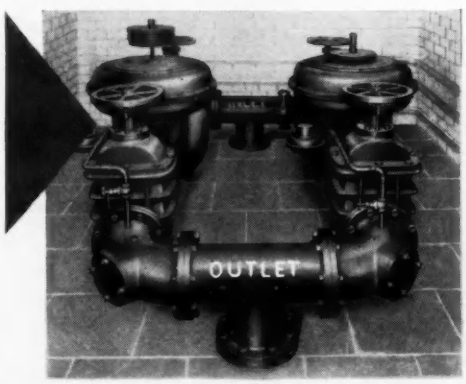

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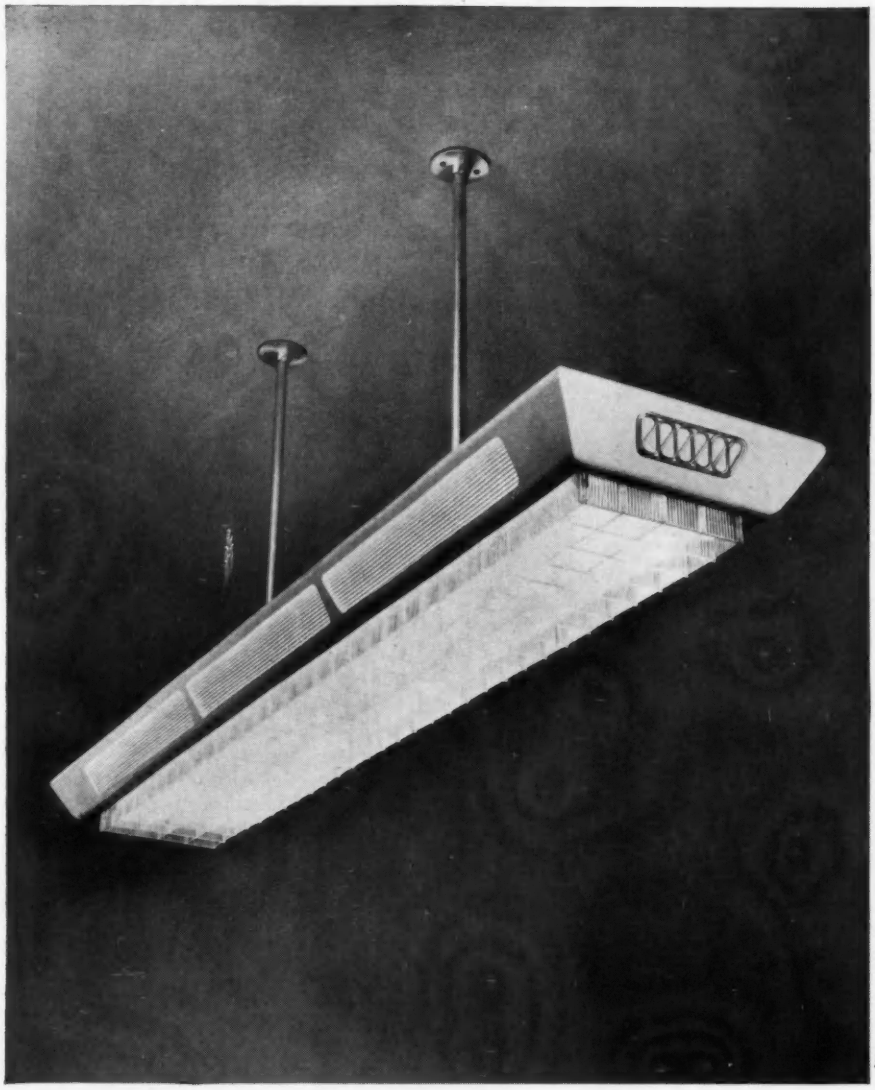

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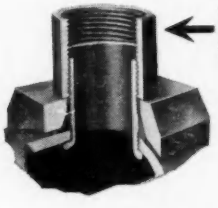

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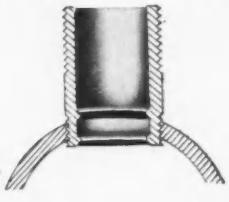

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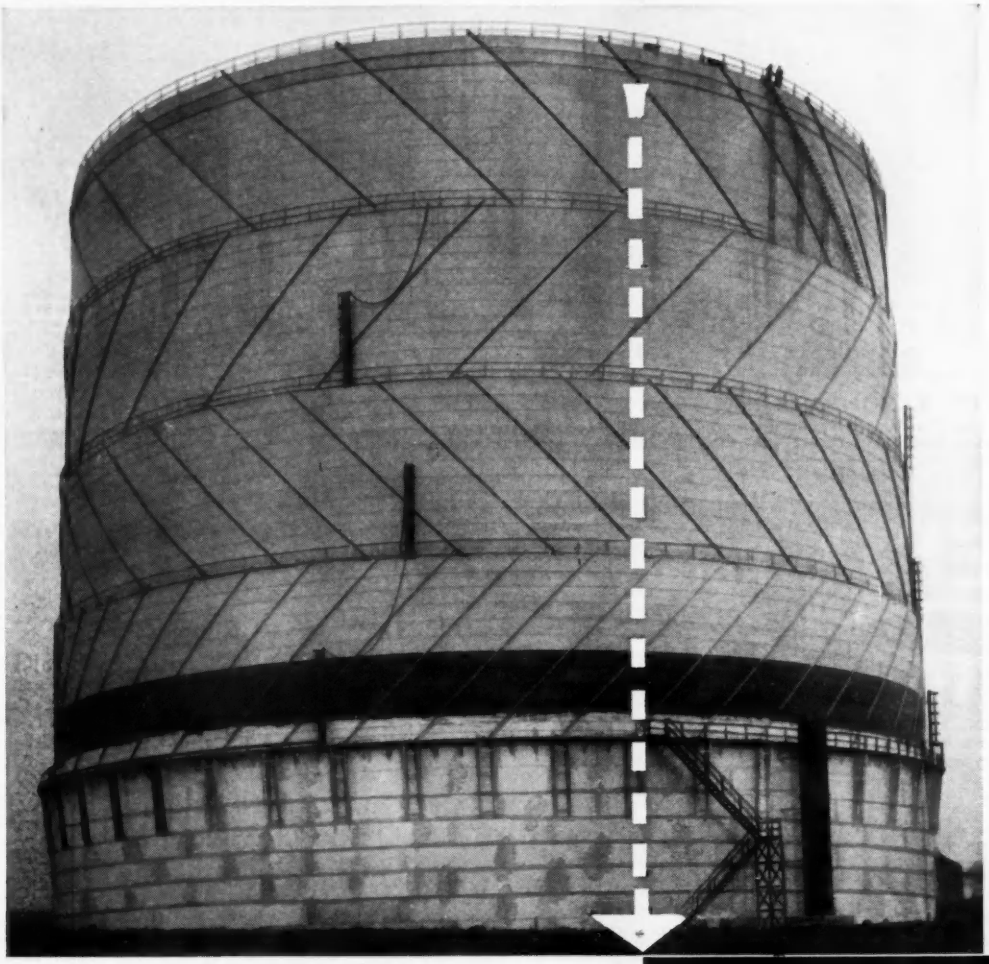

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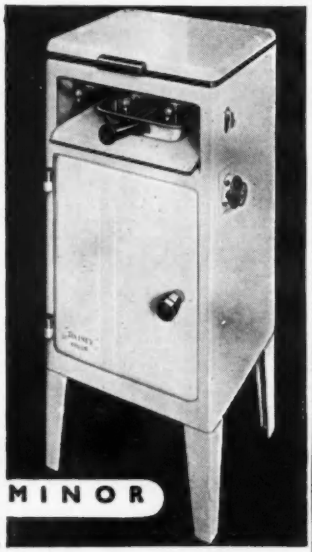

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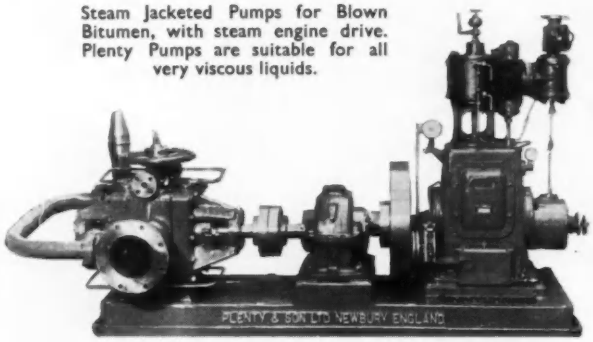

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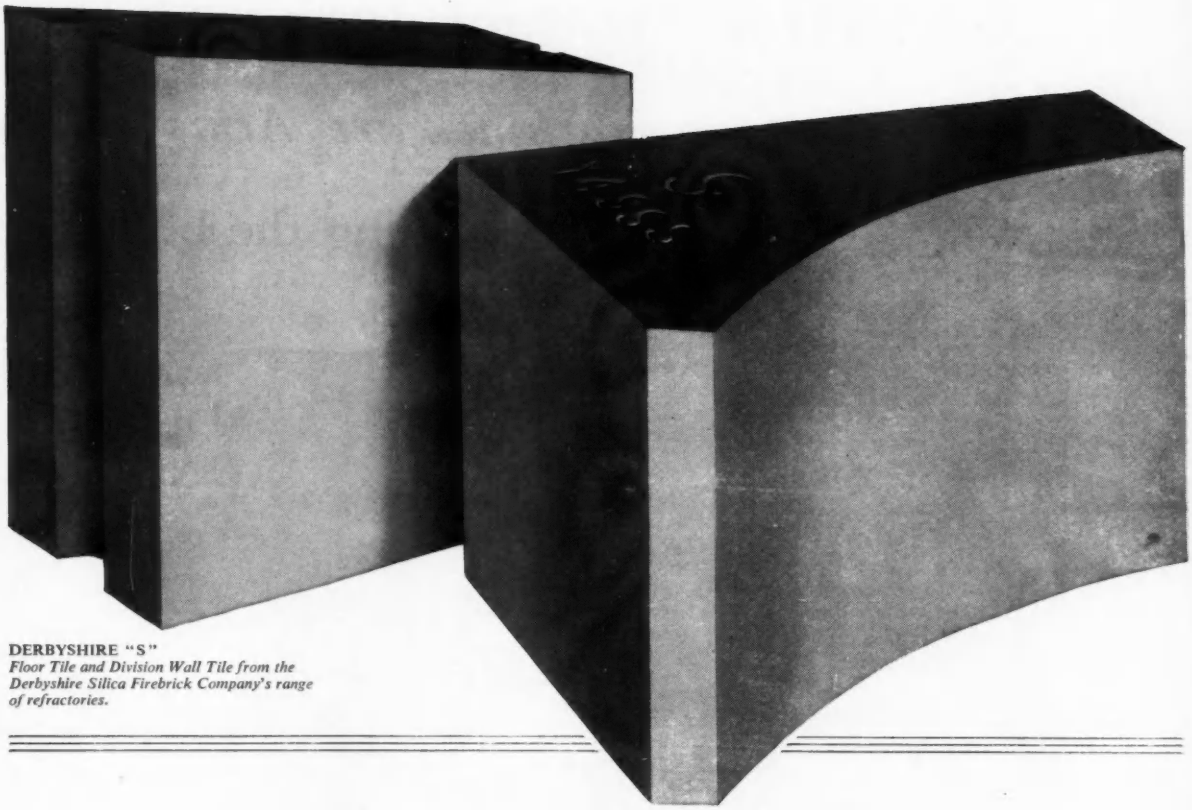

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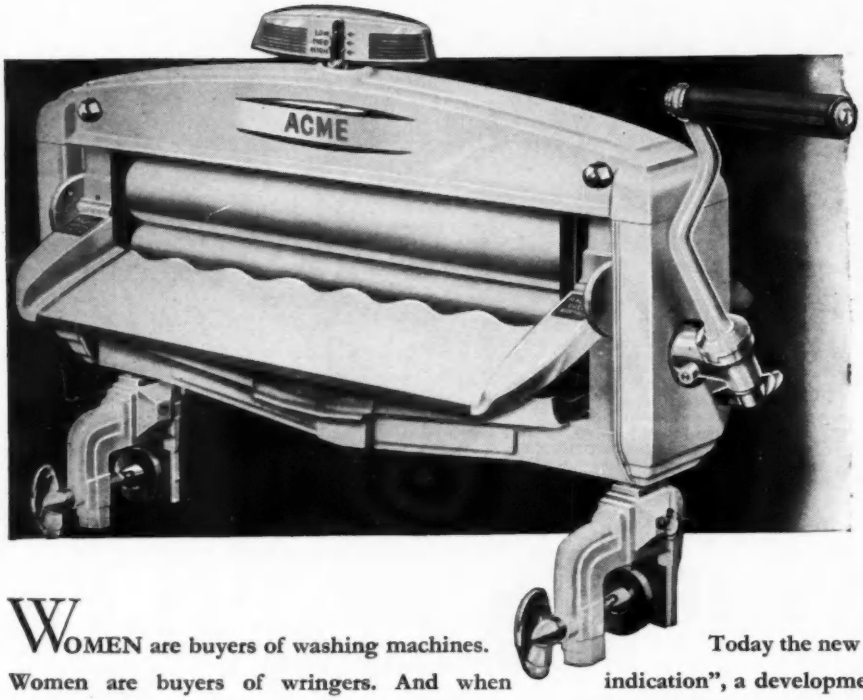

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INDEX TO 'JOURNAL' ADVERTISERS

	PAGE
A	
A.C.E. Machinery, Ltd.	
Abbott, Birks & Co., Ltd.	21
Acme Wringers, Ltd.	34
Aerogen Co., Ltd.	23
Aerograph Co., Ltd.	
Airsonic Ltd.	32
Alder & Mackay, Ltd.	
Aldridge & Ranken, Ltd.	
Allan Taylor (Engineers), Ltd.	
Allen, John, & Son (Oxford), Ltd.	4
Allied Ironfounders Ltd.	
Amal, Ltd.	72
Ascot Gas Water Heaters, Ltd.	
Ascot Gas Water Heaters, Ltd. (F. A. Neat)	
Ashmore, Benson, Pease & Co.	
Ashworth & Parker, Ltd.	
Aspinall's (Paints), Ltd.	8
Associated Lead Manufacturers, Ltd.	
Associated Lead Manufacturers, Ltd. (Rustodian)	
Atlas Preservative Co., Ltd.	7
Audley Engineering Co., Ltd.	
Automatic Telephone & Electric Co., Ltd.	36
Automotive Products, Ltd.	
B	
Bale & Church, Ltd.	73
Balfour, Henry, & Co., Ltd.	10
Bayley, Thos., (Great Bridge), Ltd.	72
Begwaco Meters, Ltd.	
Benham & Sons, Ltd.	
Birtley Co., Ltd.	
Blakeley Firth, Sons & Co., Ltd.	
Booth, John, & Sons (Bolton), Ltd.	
Bratt Colbran, Ltd.	
Bray, George, & Co., Ltd.	
Bray, W. E., & Co., Ltd.	
British Carbo-Norit Union, Ltd.	
British Gas Purifying Materials Co.	
British Jeffrey-Diamond, Ltd.	71
British Oxygen Co., Ltd.	
British Paints, Ltd.	12
British Rototherm Co., Ltd.	
British Thermostat Co., Ltd.	
British Thomson Houston, Ltd.	
British Tyre & Rubber Co., Ltd.	
British Vacuum Cleaner & Engineering Co., Ltd.	
Broadbent, Thomas, & Sons, Ltd.	
Broom & Wade, Ltd.	
Brown, J., & Co., Ltd.	
Bugden, Thos., & Co.	72
C	
Cambridge Instrument Co., Ltd.	
Cannon (G. A.), Ltd.	
Cascade Water Coolers, Ltd.	
Cathodic Corrosion Control, Ltd.	
Cementation Co., Ltd.	4
Cinema-Television, Ltd.	
Clapham Bros., Ltd.	14
Clayton, Son & Co., Ltd.	
Clifford Engineering Co., Ltd.	72
Cochrane (Middlesbro') Foundry, Ltd.	
Cohen, George, Sons & Co., Ltd.	
Concrete Proofing Co., Ltd.	16
Consolidated Pneumatic Tool Co., Ltd.	
Consett Iron Co., Ltd.	2
Cort, Robert, & Son, Ltd.	
Crane, Ltd.	70
Crone & Taylor, Ltd.	
Crosby & Co., Ltd.	
Crossley Bros.	
Crowley Russell & Co., Ltd.	
Curtis, A. L., & Co.	
Cutler, Samuel, & Sons, Ltd.	
Cuxson, Gerrard & Co., Ltd.	
D	
Davenport Engineering Co., Ltd.	
Davey, Paxman & Co., Ltd.	
Deb Chemical Proprietaries, Ltd.	
De la Rue, Thomas, & Co., Ltd. (Gas Group)	
Dempster, R. & J., Ltd.	
Dempster, Robert, & Sons, Ltd.	
Denison & Son, Ltd.	
Derbyshire Silica Firebrick Co., Ltd.	33
Diaphragm & General Leather Co., Ltd.	
Dick, R. & J., Ltd.	
Donkin (The Bryan) Co., Ltd.	Cover II
Douglas, Wm., & Sons, Ltd.	70
Drakes, Ltd.	
Dresser Manufactures (England), Ltd.	
Drew, H. B., Ltd.	
Drummond Patents, Ltd.	
E	
E.B. Refractory Cement Co., Ltd.	70
Edgar, William, & Son, Ltd.	
Elcontrol, Ltd.	
Electroflo Meters Co., Ltd.	
Electrolux, Ltd.	5
Elliott Bros. (London), Ltd.	
Erskine, Heap & Co., Ltd.	
Essard, Ltd.	
Essex Partners, Ltd.	76
Ether, Ltd.	
Evered & Co., Ltd.	23
Ewart & Sons, Ltd.	20
Ewart Chainbelt Co., Ltd.	72
F	
Fisher Governor Co., Ltd.	
Flavel, S., & Co., Ltd.	51
Fowler, John, & Co. (Leeds), Ltd.	
Franki Compressed Pile Co., Ltd.	
Franklin Furnace Co., Ltd.	
Fry's Metal Foundries, Ltd'	
G	
Gas Purification, Ltd.	73
General Descaling Co., Ltd.	
General Electric Co., Ltd.	29
Gibbons Bros., Ltd.	
Glover, George, & Co., Ltd.	1
Glover, Thomas, & Co., Ltd.	38
Godfrey, Sir George, & Partners (Industrial), Ltd.	
Goodall Clayton & Co., Ltd.	
Goodyear Mechanical Goods	
Grant, Lyon, & Co., Ltd.	
Graphite Products, Ltd.	
Green & Boulding, Ltd.	
H	
Hamilton, A. H., & Co., Ltd.	
Hardman & Holden, Ltd.	
Harris & Pearson, Ltd.	
Harrisons (London), Ltd.	
Hattersley & Davidson	
Hawkins, W. T., & Co.	
Hayward, E., & Co., Ltd.	76
Hick Hargreaves & Co., Ltd.	
Hilmor, Ltd.	
Hills (West Bromwich), Ltd.	
Holmes, W. C., & Co., Ltd.	75
Honeywell Brown, Ltd.	16
Hopkinsons, Ltd.	25
Horseley Bridge & Thomas Piggott, Ltd.	
Horstmann Gear Co., Ltd.	
Howden, James, & Co., Ltd.	
Hudswell, Clark & Co., Ltd.	
Humphreys & Glasgow, Ltd.	Supp. bet. pp. 44, 45
Hyde, Silas, Ltd.	
I	
Ideal Boilers & Radiators, Ltd.	3
I.C.I., Ltd. (Fyffes Fittings)	
I.C.I., Ltd. (Metals Division)	
Inertol, Ltd.	
Infra Red Development Co., Ltd.	
Ingham, John, & Sons, Ltd.	
J	
Jeavons, E. E., & Co., Ltd.	
Jeavons Engineering Co.	27
Jenkins, W. J., & Co., Ltd.	
Johnson, C. H., (Machinery), Ltd.	
K	
Keay, E. C. & J., Ltd.	
Keelavite Rotary Pumps & Motors, Ltd.	
Keith Blackman, Ltd.	76
Kings Patent Agency, Ltd.	74
King, Walter, Ltd.	72, 73, 74
Kirk & Co. (Tubes), Ltd.	
Kirkham Hulett & Chandler, Ltd.	
L	
LaFarge Aluminous Cement Co., Ltd.	
Laidlaw, R., & Son (Edin.), Ltd.	
Lamont, James H., & Co., Ltd.	
Le Bas Tube Co., Ltd.	
Lee, Howl & Co., Ltd.	
Lindsay, Henry, Ltd.	71
Lionweld, Ltd.	
Lind, Peter, Ltd.	
M	
Macpherson, Donald, & Co., Ltd.	31
Magnetic Valve Co., Ltd.	15
Main, R. & A., Ltd.	58, 59
Mapel Metal & Pipeline Endurance, Ltd.	12
Matterson, Ltd.	
Meltham Silica Fire Brick Co., Ltd.	9
Mercol Products, Ltd.	
Messengers & Sons (Birmingham) Ltd.	
Meters, Ltd.	
Metropolitan Vickers Electrical Co., Ltd.	
Midland Iron & Hardware Co. (Cradley Heath), Ltd.	
Milnes Meters, Ltd.	
Mint, Birmingham, Ltd.	
Mitchell Engineering, Ltd.	
Mitchell, H., & Co.	
Monitor Engineering & Oil Appliances, Ltd.	
Monk, A., & Co., Ltd.	
N	
National Benzole Co., Ltd.	
National Cash Register Co., Ltd.	
National Enamels, Ltd.	8
Newton Chambers & Co., Ltd.	facing p. 45
Norwest Construction Co., Ltd.	
Nu-Swift, Ltd.	73
O	
Oxley Engineering Co., Ltd.	
P	
Parkinson & Cowan (Gas Meters), Ltd.	18, 19, 38
Parkinson Stove Co., Ltd.	
Pass, E., & Co., Ltd.	30
Peart, E., & Co., Ltd.	
Peebles & Co., Ltd.	
Perl Controls, Ltd.	37
Plenty & Son, Ltd.	32
Power-Gas Corporation, Ltd.	
Press, William, & Son, Ltd.	11
Provincial Exhibitions, Ltd.	
Pulsometer Engineering Co., Ltd.	
R	
Radiant Heating, Ltd.	
Radiation, Ltd.	52, 53
Rawlplug Co., Ltd.	
Reavell & Co., Ltd.	72
Ride & Bell, Ltd.	25
Riley, A. J., & Son, Ltd.	
Roberts, R. E., & Sons, Ltd.	28
Robinson, J. H., & Co. (Liverpool), Ltd.	
Royston, Geo., & Sons, Ltd.	
Rozalex, Ltd.	
Russell, R., & Sons, Ltd.	32
S	
Salter, T. E., Ltd.	
Senior Economisers, Ltd.	
Siebe Gorman & Co., Ltd.	
Sieber, Jas., Equipment Co., Ltd.	
Siemens-Schuckert (Great Britain), Ltd.	
Sigma Instrument Co., Ltd.	
Simon-Carves, Ltd.	
Simon, Richard, & Sons, Ltd.	
Sisson, W., & Co., Ltd.	
Smith Meters, Ltd.	Supp. bet. pp. 44, 45
Smith, Thos., & Sons (Rodley), Ltd.	76
Spencer Bonecourt, Ltd.	
Sperryn & Co., Ltd.	1
Stanton Ironworks Co., Ltd.	Cover IV
Staveley Iron & Chemical Co., Ltd.	17
Stein, John G., & Co., Ltd.	
Stelcon (Industrial Floors), Ltd.	
Stewart & Gray, Ltd.	
Stewarts & Lloyds, Ltd.	
Stillite Products, Ltd.	
Stothert & Pitt, Ltd.	
Stoves, Ltd.	13
Strachan & Henshaw, Ltd.	
Stringer Bros.	74
Sugg, Wm., & Co., Ltd.	22
Supra Chemicals & Paints, Ltd.	
Sutcliffe, R., Ltd.	
Sutcliffe Speakman & Co., Ltd.	69
Sutherland, A. G., Ltd.	
T	
T & T Works, Ltd.	
Tangyes, Ltd.	
Thermal Syndicate, Ltd.	30
Thompson, Edward, Ltd.	71
Thorp, Thomas, & Co., Ltd.	
Tully Engineering Co., Ltd.	
Turners Asbestos Cement Co., Ltd.	
U	
Underpressure Engineering Co., Ltd.	
United Kingdom Construction & Engin. Co., Ltd.	
Unit Superheater & Pipe Co., Ltd.	
V	
Vaughan, Edgar, & Co., Ltd.	
Visco Engineering Co., Ltd.	
Vulcan Stove Co., Ltd.	
W	
Wade Couplings, Ltd.	
Wakelin, F. H., Ltd.	
Walker Bros., Ltd.	
Walker, C. & W., Ltd.	Cover I
Walker, Crosweller & Co., Ltd.	26
Walker, Wm., & Sons (Hanley), Ltd.	Cover II
Waller, George, & Sons, Ltd.	6
Walter King, Ltd.	72, 73, 74
Ward, Thos. W., Ltd.	24
Watson, Robt., & Co. (Constructional Engineers), Ltd.	
Weir, G. & J., Ltd.	
Wellington Tube Works, Ltd.	
Wellman Smith Owen Engineering Corpn., Ltd.	
West's Gas Improvement Co., Ltd.	Cover III
West's Piling & Construction Co.	
Westwood & Wrights, Ltd.	
Whessoe, Ltd.	
Whitley Moran & Co., Ltd.	
Whitlock Bros., Ltd.	
Wilkes, A. H., & Co., Ltd.	70
Willey & Co., Ltd.	
Williams, John E., Ltd.	
Williamson, Cliff, Ltd.	
Wilson, George, Gas Meters, Ltd.	
Winn & Coales, Ltd.	
Woodall-Duckham Construction Co., Ltd.	facing p. 44
Wood, Hugh, & Co., Ltd.	
Wormald Patent Locks Co., Ltd.	
Y	
Yorkshire Copper Works, Ltd.	

Agencies	
Appointments Vacant	74
Appointments Wanted	
Contracts Open	
Educational	
Fellowship	
Miscellaneous	
Patents	74
Plant For Sale	74
Publications	

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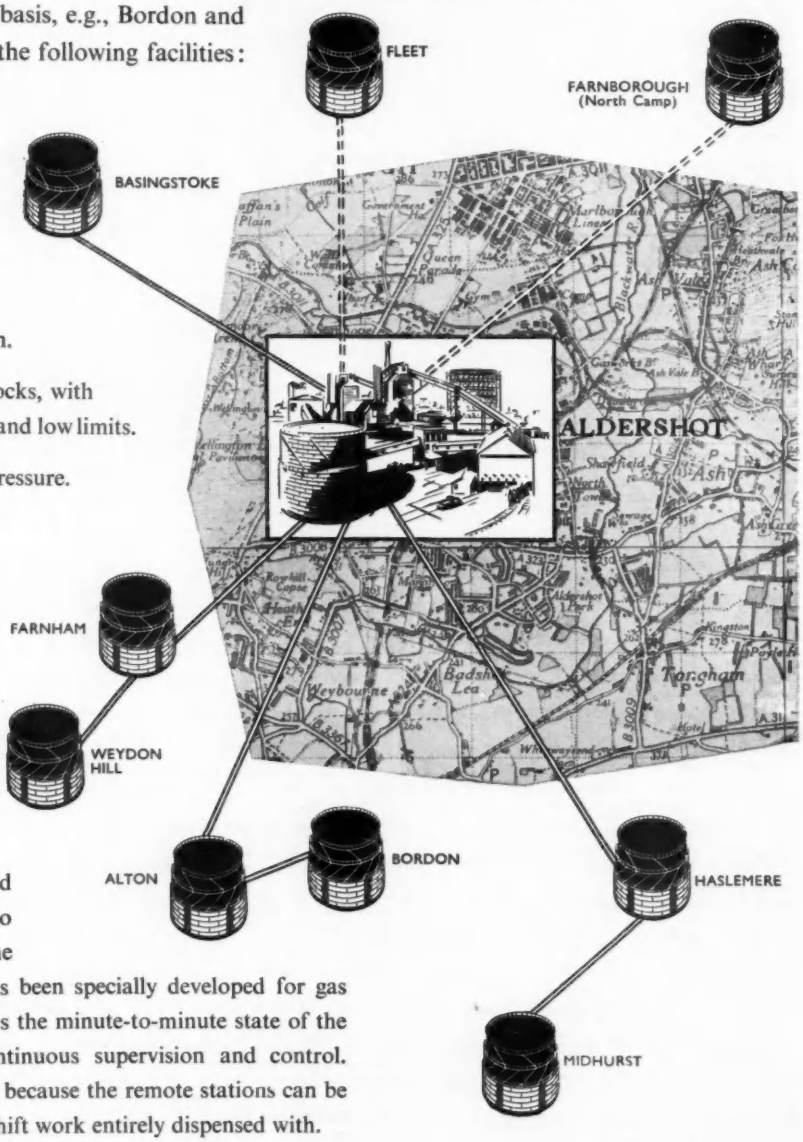
(*e*) Remote indication of the district pressure.

(*f*) Remote control (start/stop) and indication (running/stopped) of the station booster.

(*g*) Remote indication and alarm of electricity supply failure.

(*h*) Equipment testing facilities.

(*i*) Telephone communication.



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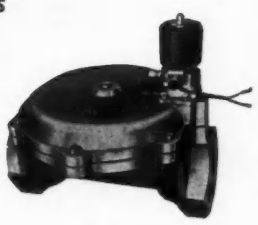

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VOL. 284 NO. 4818 October 5, 1955

107TH YEAR

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CONTENTS

EDITORIAL COMMENT

The Institute of Fuel .. 39
Due Praise .. 40
The Smokeless City .. 40
6th International Gas Conference .. 41

TECHNICAL RECORD

New Loads and New Costs. By J. Burns, G.M. .. 43
Domestic Fuel for Smokeless Heating. By G. E. Foxwell .. 48
Power Problems in Gas Manufacture and Distribution. By B. Wilkinson .. 49

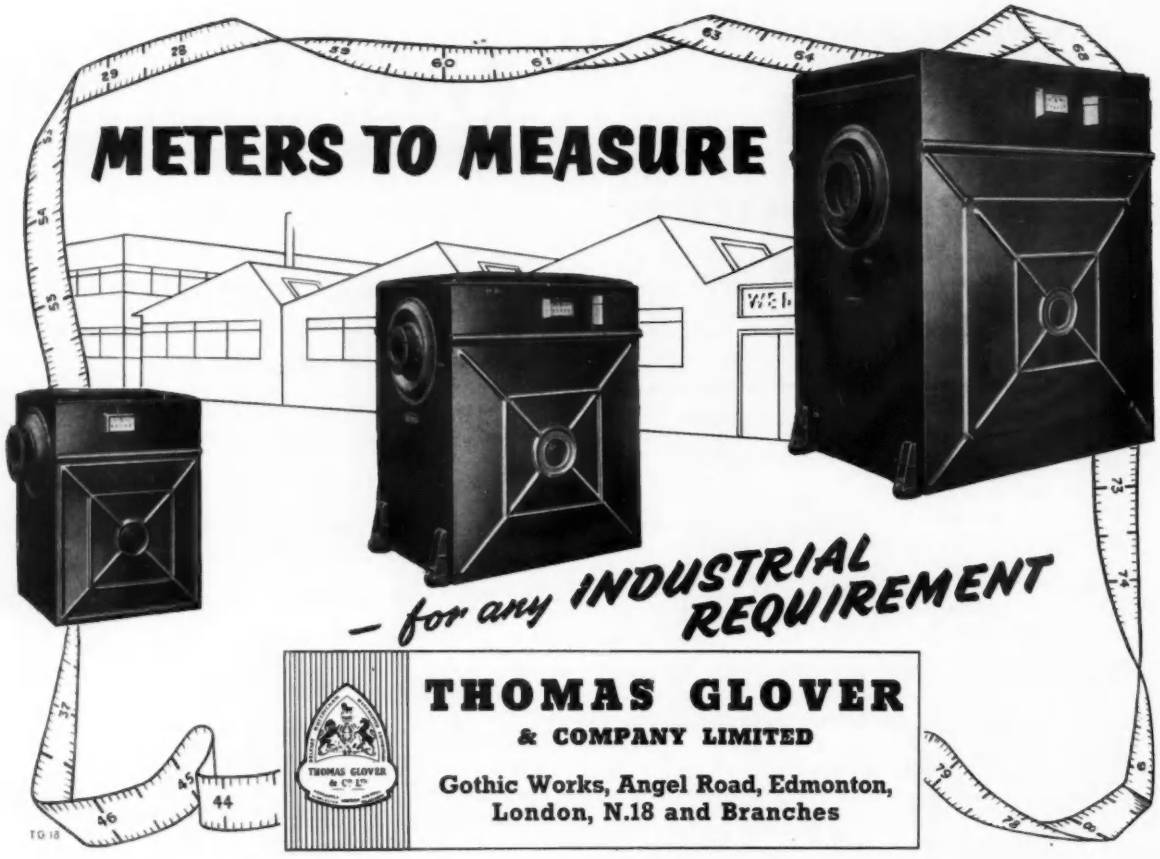
SPECIAL ARTICLES

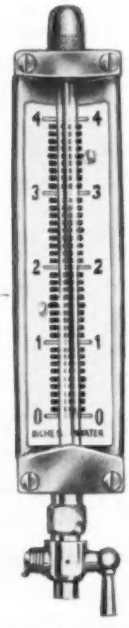
Building in Precast Concrete .. 57
The International Gas Union Meeting .. 60

NEWS OF CURRENT EVENTS

Personal .. 42
Obituary .. 42
Diary .. 42
Calendar and Directory Alterations .. 42
Standard for Solid Fuel Burning Boilers .. 47
Gas Council Dramatic Society .. 47
News in Brief .. 61
Scottish Association Meeting at Inverness .. 62
Scottish Association of Gas Managers—Golf .. 63
Scottish Association of Gas Managers—Bowls .. 64
Parkinson Stove Company's Long Service Association .. 65
Northern Gas Board Introduces 'Colour in the Home' .. 65
Road Safety Awards .. 66
B.S.I. Sales Office in Birmingham .. 66
Company News .. 66
New Coking Plant .. 67
North Thames 'Bride of the Year' .. 67
Stringer Brothers Centenary .. 67
New World Gas and Coke Fire .. 68
New Showroom for Uxbridge .. 68

PUBLISHERS' NOTICE, SEE PAGE 73





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Gas Journal

VOLUME 284. No. 4818. OCTOBER 5, 1955. 107th YEAR

The Institute of Fuel

THAT the Clean Air Bill and the complications of the problem of abolishing air pollution is very much in the minds of members of the Institute of Fuel is shown by the topics for discussion in the programmes of its several Sections, both in London and the provinces. In London the great event is to be the Special Study, timed for next May, of Domestic Heating in the United Kingdom. The conference is to occupy two days with four sessions, morning and afternoon, closing with an evening session in which the whole subject is to be reviewed. All aspects of the subject are to be covered, fuels, their nature and availability, appliances for the use of solid, liquid and gaseous fuels, and their impact on domestic architecture and economy. The widest possible range of interests, from the industries and local authorities to manufacturers and salesmen, architects, builders and merchants, have been invited to participate, and it is anticipated that most of the invitations will be accepted. The whole scheme is in the hands of a representative committee under the vigorous and capable chairmanship of Dr. Foxwell. We understand that large attendances are expected and that the great assembly hall at Church House has been booked for the meetings.

The North-Western Section, biggest of the provincial Sections, has arranged a joint meeting in February with the Manchester and District Section of the I.G.E. to discuss a symposium on coke. The discussion, it is intended, will be opened by Dr. Andrew Semple on 'The Smoke Problem.' Two technical papers are to be presented, one by Dr. Foxwell on 'Coke Manufacturing Problems,' the other on 'Coke Utilization' (in the domestic field) by E. H. Coley, of the research and development department of Radiation, Ltd.

Other papers bearing directly on the main subject are J. E. Hawkins and G. Nonhebel, in London, on 'Chimneys and the Dispersal of Smoke'; J. S. Hales, in Liverpool at a joint meeting with the Smoke Abatement Society, N.W. Division, on 'Some Problems in Domestic Heating'; Ronald Williams, in Birmingham at a similar joint meeting on 'The Work Entailed in Creating Smokeless Zones"; and Lt.-Col. A. Vaughan Cowell in Edinburgh on 'Smokeless Fuel Production.'

Bearing more indirectly on the clean air campaign are, 'Industrial Aspects of the Beaver Report' by G. Nonhebel to be presented to the Midland Section, which is also staging a 'Fuel Forum' at a joint meeting with the Institution of Heating and Ventilating Engineers. 'Grit and Dust Collection from Industrial Furnaces' is to be discussed at Nottingham by J. E. O'Brien at a joint meeting with the Incorporated Plant Engineers. 'Wales Gas Board—Integration of Fuel Supplies' is the title of a paper to be presented jointly by E. M. Edwards, W. T. Hird, T. S. Ricketts and S. L. Wright at Cardiff, while Dr. Foxwell is to address a joint meeting of the Midland Section with the North Staffs. Fuel Society on 'National Fuel Reserves in the Light of National Fuel Requirements.'

Coal in general is to be covered by such papers as 'Research at the National Coal Board' at Cardiff and 'Some Recent Advances in Fuel Research" in Manchester, both by Dr. Idris Jones; Prof. A. L. Roberts on 'Recent Developments in Fuel Technology' at Nottingham; 'Some Coal Research Problems and their Industrial Implications' by R. L. Brown in London, and 'Coal Preparation and Evaluation' by J. K. Matthews which is to be given in Manchester and repeated in Liverpool and Newcastle. The Melchett Lecture is to be given in London on December 7 by Dr. A. Parker who has for his title 'Power, Population and Productivity.'

Oil is attracting a good deal of attention. Some of the papers are, 'Combustion of Liquid Fuels' by W. M. Mullins at Birmingham, 'Modern Applications of Oil Firing' by R. J. Baldry at Cardiff, and the 'Outlook for Liquid Fuels in the United Kingdom' by J. A. Higham at Leeds. A general discussion on oil fuels with films is to be staged in Edinburgh, and P. E. Rousseau is to address the London Section on the 'Oil-from-Coal Project of the South African Government.'

Gas engineers will be particularly interested in 'The Utilization of Steam and Power in Modern Gasworks and Coking Plants,' by L. J. Clark in London; 'Gaseous Combustion' by Dr. J. H. Burgoyne at Derby; 'Modern Gas Production' by J. E. Tully and D. J. A. Mansell at Glasgow; 'The Two-stage Gas Producer' by P. Clark at Sheffield; 'The Modern Calorimeter' by J. Brown at Newcastle—and no one who can hear or read it will want to miss 'The Impact of Refractory Materials on the Efficient Use of Fuel' to be delivered to the Midland Section in Birmingham on October 27 by Dr. A. T. Green.

Nuclear energy will be discussed in five sections: J. L. Gillams on 'The Harnessing of Nuclear Power

for Industry " in London; ' Nuclear Power Stations ' by H. S. Arms at Loughborough College and (apparently) repeated at Leeds; ' Nuclear Power Generation ' by H. A. Davey at Glasgow and ' Atomic Energy Generation ' by E. J. Brown at Port Talbot.

Among the miscellaneous papers are some of considerable interest. There is, ' Fuel Practice in Italy ' by Prof. C. Padovani in London and Bristol; ' The Occurrence, Extraction and Properties of Germanium ' by A. R. Powell in Birmingham; ' Implications of the Rivers (Prevention of Pollution) Act, 1951 ' by A. H. Williams at Cardiff; and ' Hydrogen Peroxide and Rocket Fuels ' by W. S. Wood at Glasgow, as well as a number of papers on boiler practice, waste heat recovery and the gas turbine.

It will be agreed that this programme provides an excellent opportunity for gas engineers, members of the Institute and those who, no doubt, will be welcomed at its meetings, to put forward in discussion the views of their own industry in the provision and utilization of many forms of fuel. It is to be hoped that these opportunities will not be neglected. Particularly, it is suggested that the example of the Manchester and District Section of the Institution of Gas Engineers in promoting and welcoming a joint meeting annually with the corresponding Section of the Institute of Fuel should be followed in other regions.

Due Praise

IT is rumoured that an increase in purchase tax on domestic appliances might be included in an autumn budget. We do not know how or where this rumour originated nor whether it is true, but it has made us think. Purchase tax on domestic appliances has been fairly static during the last few years. Since 1953 it has rested at 50% on most, 25% on a few, and nothing on a few others. Nevertheless, as it stands at the moment, this tax is sufficient to deter some householders from investing in new appliances. If the mentioned rumour matures into fact, then there will be an added deterrent. Further to purchase tax are the hire purchase controls. These can be regarded as considerable obstructions to easy sale, particularly as the controls have been subjected to so much bewildering fluctuation. Last year they were completely removed but shortly afterwards they were all reimposed and not long ago they were increased. Now that the increase, in July, of coal prices is beginning to be felt by gas, coke and electricity consumers, discontent is spreading among them, and that means the nation in general. They consider that something should be done about it; that the ' scientists ' should be able to devise new appliances of much greater efficiency and that they should be able to find new methods of producing fuels, so as to counteract the burden of greater costs.

In an effort to make various gas and coke appliances more readily saleable to consumers, and also to help the nation to reduce its ' coal gap ' and to bear more easily the impact of raised fuel prices, engineers and fuel efficiency experts *have* been working towards greater efficiency in appliances. The technical advances in gas manufacture and the improvements in consumer service that have been made are very considerable. The techniques of gas manufacture are now so much improved that production has become, in fact, relatively cheaper, and it is only because coal prices have gone up so much that the reverse seems to be the case. On the utilization side, one notable and almost revolutionary advance that has been made by several independent organizations is the development of the free-standing fire. Its efficiency of combustion and heat recovery are now quite remarkable. When the Clean Air Bill becomes law it can be expected that many people will invest in these new fires. Gas burning appliances, too, are now in use which can show effective efficiency increases over the pre-nationalisation models. All these and other associated improvements are the results of much expenditure, time, and ' sweat of the brow.' What is more, the results are good—very good. And yet they pass unnoticed. Why? Because the technical advances, great as they are, are so darkly overshadowed by the previously mentioned deterrents and the high percentage (18% in July) increases in basic fuel costs. The public cannot appreciate the efforts that are being made for their comfort and economy.

Technologists in the gas industry may well feel as if they are swimming at a speed of 5 miles per hour against a tide of 18 miles per hour, and they are naturally frustrated. Numerous organizations, the technical Press among them, do, however, fully appreciate the value of the work done and would regret any diminution of the effort expended. The people of this country, too, although they may not realize the full significance of these technical advances, would be that much the poorer if their progress failed to continue.

A SMOKELESS CITY

ON Sunday last the City of London became a smokeless zone and thus marked another milestone on the road towards a cleaner Britain. According to the announcements it is proposed that enforcement of the regulations governing the new zone should be light for a few weeks to allow some consumers to use up stocks of fuel which they have accumulated; furthermore, certain particular offenders such as large railway termini will be allowed a little time to overcome their special difficulties. The main thing, however, is that another smokeless zone has been established and that the fouling of the atmosphere above our cities may be expected to diminish that much further. It was a fitting climax to the conference of the National Smoke Abatement Society which ended at Bournemouth on September 30 that this important step forward in the campaign for cleaner air should take place when it did. The majority of the credit for the progress which has been made in the smoke abatement drive is due to the Society, which has ' fought the good fight ' so well.

Before too many hats are thrown in the air in celebration of the event to which we have alluded, it is most important to realize one thing. This is that the success or failure of the whole idea of smoke abatement depends entirely on the adequate supply of smokeless fuels to the factories, offices and homes within the smokeless zones which have been, or are likely to be, established. If these supplies are inadequate no amount of legislation or regulations will prevent a return, in part at least, to the smoke and grime of the past. Gas, electricity and oil have a very important part to play and it is fairly certain that they will prove equal to their share of the task. But how about solid smokeless fuel? Have the necessary arrangements been made to ensure that sufficient coke, for instance, will be available to replace coal if a consumer so desires? If coke supplies fail at such a crucial time, consumers in the smokeless areas, perforce, will turn to some other form of heating—and it may not be by gas!

6th International Gas Conference

Mr. C. A. King, Managing Director of the 'GAS JOURNAL', who is a member of the British party attending the conference, sent this report on the proceedings of the first few days.

NEW YORK, *September 27.*

THE days are now beginning to pass by very quickly as they always do on holiday—or in this case should we say on an eagerly awaited break from normal routine? The past five days have provided a veritable kaleidoscope of new faces, new places and memorable events.

First let us have a little jingoism of our own, and say Hurrah for England and down with those of our compatriots who write seethingly to the Press about the reception given to foreigners landing at our docks. Arriving at 11.30 p.m. last Wednesday night, we collected our baggage in a benchless customs shed and were told it was up to each to attract the attention of an officer. When eventually that attention was effected, it was graceless indeed. We ourselves in our honesty declared thirty copies of a certain magazine we were carrying as samples; and the formality of paying 20c. for the privilege took another quarter of an hour of precious time. Then the midnight relay race for a taxi and the half an hour queue for hotel keys.

But that somewhat ruffling arrival has since been cancelled out a hundred times by the cordiality of our hosts, their foresight in arranging every detail for our convenience, and their unbounded hospitality. This 'get together' business has not been marked by anxious faces and corner huddles, but by a spontaneous and uninhibited approach which has broken the most insular ice.

Topton Plant of 'Caloric'

Late though our arrival was, 26 of the British delegation were on parade at breakfast time on the Thursday for a three-hour bus run to the works of the Caloric Appliance Corporation, manufacturers and nation-wide distributors of gas ranges, clothes dryers, automatic washers and incinerators. The Klein who founded this business was active in it to the age of 83 and died recently aged 95. His sons Nathan and Julius are now respectively Chairman and President of the Company; two other sons and three grandchildren are on the payroll. A worthy record! From the single building of the original foundry, Caloric has grown until today it covers over 200 acres. More than 1,100 people in the town of Topton (population 1,700) work for the firm which put the place on the map.

The works is a first-rate example of streamline manufacture and its highlight product—a 36 in. gas range—is designed almost to think for the housewife, though the amount of electric wiring would possibly present a maintenance problem to the staff of an area gas board. More will be heard of the extremely sensitive boiling burner automatic control which was demonstrated in a lecture after lunch.

Lunch was a meal typical of that Pennsylvania district known as Dutch, as it was developed by descendants of the Hessian mercenaries who fought with the French. It is noteworthy that three broadcasting companies seized the opportunity of taking recorded conversations from Mr. Cheetham and other leaders of the delegation.

The gift of a Caloric enamelled plaque as souvenir, and so to the Benjamin Franklin Hotel in the beautiful city of Philadelphia.

Philadelphia Entertains

Immediately we were the guests at a reception and dinner given jointly by the American Meter Company, Caloric Appliance Company, the Electric Company, the Gas Works Division, Sales Corporation, and the United Gas Improvement Company. There were over 130 present, and many local celebrities were here to welcome the conference. We were reminded that the city was founded in 1682 and that it preserves an international flavour. Certainly it has great beauty and tremendous character.

And that first day ended leaving one impressed with the excellence of the organization which has since continued from day to day.

United Gas Improvement Company

Friday morning was devoted to an inspection of Station 'A' of the Philadelphia Gas Works. The U.G.I. operates under lease, through its Gas Works Division, the municipal gasworks owned by the city.

Among the incorporators of the original U.G.I. Company was T. S. C. Lowe, who invented and developed to a workable degree the water gas process and took out patents for it in 1872 and 1875. Working under Lowe was A. G. Glasgow—now Dr. Arthur Glasgow—who later founded the firm of Humphreys and Glasgow.

It is noteworthy that at this very large works there is now no carbonizing plant, but a 720 B.Th.U. mixed gas is supplied to approximately 560,000 consumers in the municipality of 2,150,000 persons. The plant has many features of great interest, and it is hoped to describe it in considerable detail in a later issue of the 'JOURNAL.'

After the tour, lunch was served in the plant restaurant. Here, Mr. Edward Smoker, President of the Company, who had started his career as a junior on those same works, made reference to the work of the guides and the reception committee; and Mr. George Currier, Hon. Secretary of the I.G.E., voiced the thanks of all the visitors. He said he had never known a gasworks visit better organized. He also expressed the regrets of the President of the I.G.E., Mr. W. K. Hutchison, that he had been unable to attend.

American Meter Company

An afternoon visit was to the Philadelphia Works of the American Meter Company, which was founded in New York City in 1836 and today employs over 2,000 highly skilled operatives in nine plants in the United States. There are also two modern plants in Canada, under the name of the Canadian Meter Company.

The Company point out that for many years the 'cash register of the gas industry' has been the tinned steelcase displacement meter—the basic Thomas Glover 2-diaphragm slide-valve meter. Some of the latest refinements include the 'Duramic' diaphragm, rubber grummet seals, bakelite valves and oil-impregnated porous bronze bearings.

A recent product is the welded steelcase, displacement meter; another development, the 5B-225 'Aluminumcase' meter introduced in early 1954. The meter body is a one-piece alloy die-casting, in the manufacture of which all major operations are performed by special machines.

Among the 2,000 employees are quite a number of women tinsmiths, whose standard of work is claimed to be equal to that of the men. The whole plant impressed the writer of these notes as a fine example of the result of time and motion study.

Washington

And so to Washington, D.C., where we arrived about 10 p.m. in the fine Statler Hotel. Here we were left to devise our own pleasures, but on the humid and drizzly Saturday morning twenty-one of our party banded together in a private bus tour of Washington, Alexandria and Mount Vernon. We saw the Smithsonian Institute, the Capitol, the Lincoln Memorial, the Arlington Cemetery, and witnessed the changing of the guard at the Unknown Soldier's Tomb. We saw where Washington lived and worshipped, and learned how much is enshrined in that lovely corner of the land.

The weather, which in any case improved, was forgotten as we viewed the beauties of Washington, its architecture and monuments—far transcending the ideas formed from a casual and perhaps unwilling glance at books and magazines.

We checked-in again at the New Yorker late in the evening, tired perhaps but enchanted by new experiences; and it may be added that by the time the first business session opened on Tuesday, September 27, most of the delegates had travelled the 1,250 ft. up the Empire State Building and sailed for three hours on the circuit of Manhattan Island.

Personal Notes

MR. A. H. DYER, at present Deputy General Manager and Engineer, has been appointed to succeed MR. J. F. RUST, M.B.E., as the General Manager and Engineer of the Newport Undertaking of the Wales Gas Board on the retirement of Mr. Rust at the end of this year. Mr. Dyer was educated at Newport High School under the late Mr. F. E. Battersby, and at the Technical College under Mr. F. W. R. Harrison. Joining the staff of the Newport Mon. Gas Company in 1918 he held various appointments, and was made Assistant Engineer in 1940, Deputy Engineer in 1947 and Deputy General Manager and Engineer in 1949. He is Vice-Chairman of the Wales and Monmouthshire Section of the Institution of Gas Engineers; a past President of the Wales and Monmouthshire Junior Gas Association and a past Chairman of the Joint Council of the British Junior Gas Association.

MR. W. T. CRADDICK has been appointed Buying Manager for Cannon Industries, Ltd. He replaces MR. W. L. ROBERTS, who is no longer with the Company.

MR. GEORGE E. GAMBLE is retiring from the firm of William Whitehouse and Co., Ltd., manufacturers of gas fittings, at Brueton Street, Birmingham. Mr. Gamble, who is 81, has served the firm for 61 years—from junior clerk to director. Mr. Gamble is particularly interested in music and was in the choir at Aston Parish Church until he was 28, and was also organist at Emmanuel Parish Church, Wylde Green, for 30 years.

MR. H. W. BOSWORTH, Chairman of Lancashire Dynamo Holdings, Ltd., will give up that position at the end of the year. The Chairmanship will then be taken by SIR PERCY H. MILLS, BT., K.B.E. Mr. Bosworth will retain his seat on the Board and his connection with the associated companies. MR. S. F. STEWARD, C.B.E., becomes Managing Director. The Minister of Fuel and Power has agreed to release Mr. Steward from his present position as Chairman of the South Western Electricity Board at the end of the year and the appointment with Lancashire Dynamo Holdings, Ltd., will take effect from that date.

Obituary

MR. EDWARD A. HARMES died on September 20, at the age of 79. Before his retirement in May, 1953, Mr. Harmes had given the Brighton Company and the South Eastern Gas Board nearly 54 years of continuous service. Born in 1886, he started work with the Brighton and Hove General Gas Company as a Laboratory Assistant in 1899, and later became General Engineering Assistant. On demobilization in 1919 he was appointed Chief Draughtsman for the reconstruction of the Portslade Works, and was later made Engineering Assistant to the late Mr. C. H. Rutter, Engineer and General Manager. On the

retirement of Mr. Rutter in 1935 he was appointed Civil and Constructional Engineer, and Resident Engineer at the Hove Works. Mr. Harmes, who was well-known and very popular with his colleagues and friends in Brighton, came from what we may call a 'gas family.' His father served in the industry for 48 years, one of his brothers is now pensioned, and the other is still employed at Portslade Works.

MR. P. A. SCHWARTZ, a former coke oven manager, has died at Durham at the age of 74. Mr. Schwartz arrived in Britain from Germany about 50 years ago to help in the construction of new coke ovens at Blaydon-on-Tyne and Crook. He became Manager of the Bankfoot Works at Crook and later Manager of the New Brancepeth works. He retired five years ago, but since then had acted as consultant to a firm of coke oven builders.

MR. ROBERT C. MACDONALD, Chief Mechanical Engineer of the South Metropolitan Gas Company from 1916 to 1934, has died in hospital at Melrose at the age of 81. His home was at Ard, West Linton. Mr. Macdonald served his apprenticeship with Sir William Arrol & Co., Ltd., Glasgow, where in 1914 he became Works Manager, a post he held until his appointment to the South Metropolitan Gas Company in 1916. Among works for which he was responsible while in the service of the South Metropolitan Gas Co. were the rebuilding of London's biggest gasholder following the Silvertown explosion in 1917, the reconstruction of the company's workshops at Greenwich, and the modernization of their entire plant. He retired in 1934.

Diary

October 6.—NORTH WESTERN G.C.C.: Partington Works, 12.30.

October 6.—WALES AND MONMOUTHSHIRE SECTION, I.G.E.: Annual Meeting, South Wales Institute of Engineers, Cardiff; official luncheon, Park Hotel; visit to Nantgarw coke ovens.

October 7.—SCOTTISH JUNIORS (WESTERN): 'Radiant Heating—A Survey of Past, Present and Future,' H. E. Robinson. 522, Sauchiehall Street, Glasgow. 6 p.m.

October 8.—YORKSHIRE JUNIORS: Annual General Meeting, Bridge Street, Leeds, 2.30 p.m.

October 8.—SCOTTISH (EASTERN) JUNIORS: Visit to Dunfermline gasworks, followed by Presidential Address of J. C. Macdonald (Perth); Gas Showrooms, Dunfermline.

October 10.—NORTHERN G.C.C.: 30, Grainger Street, Newcastle-upon-Tyne, 11.15 a.m.

October 11.—MIDLAND JUNIORS: Presidential Address; Staff Mess Room, Council House, Birmingham.

October 12.—SCOTTISH G.C.C.: 26, Drumsheugh Gardens, Edinburgh, 11.30.

October 14.—LONDON AND SOUTHERN JUNIORS: Presidential Address, N. R. Junkison, Edgware Road, 6.30 p.m.

October 14.—MIDLAND SECTION, I.G.E.: Autumn Meeting, Palace Hotel, Buxton. 11.0 a.m. Paper by H. Oliver and K. Carr: 'Some Observations on Refractories for Gas Retorts.'

October 18.—LONDON AND SOUTHERN SECTION, I.G.E.: Annual General Meeting, Pepys House, 14, Rochester Row, S.W.1, 2.30 p.m.

October 19.—LONDON AND COUNTIES COKE SALES CIRCLE: Visit to Beckton gasworks.

October 19.—SOUTH WESTERN SECTION, I.G.E.: Annual General Meeting, Swindon.

October 25.—EASTERN G.C.C.: Connaught Rooms, Great Queen Street, W.C.2, 11 a.m.

Calendar & Directory Alterations

The following changes have been notified during the past month. To keep the information in the current 1955 edition of the GAS JOURNAL CALENDAR AND DIRECTORY up to date readers are invited to note these alterations in the Directory Section.

Page D106.—RUGELEY: Delete T. R. H. McGill, *E. & G.M.*, deceased.

Page D116.—KEITH: Delete T. Mackie, *Dist. M.*, retd.

Page D117.—LINLITHGOW: Delete T. F. Scott, *Dist. M.*

Page D144.—EASTERN SECTION: Officers for 1955-56. J. H. Greenacre (Yarmouth), *Chairman;* R. C. Wardell (Boston), *Senior Vice-Chairman;* D. B. Parkinson, *Junior Vice-Chairman;* J. Hunter-Rioch (Cambridge), *Hon. Secretary and Treasurer.*

New Loads and New Costs*

By J. BURNS, G.M., PH.D., B.SC., F.INST.F.

Chief Engineer, North Thames Gas Board.

WHILE the increase in output in the industry has not been spectacular over the last few years, there has been a steady development in new loads with very little change in our old-established consumers. Competition over the last few years has intensified but, at the same time fortunately, we have now a greater appreciation of the value of particular loads to the industry. I think the position now is that the industry cannot disregard any load or potential load that it can fairly and squarely get in competition with other fuel supplying industries but, at the same time, there should be complete clarity on the value of the load and the price which should be paid for it.

As our standard of living improves with full employment there is likely to be a greater call for fuel which is easily controllable and always available with the minimum fuss or bother, and it is our duty to see to it that the gas industry should be ready to meet that requirement. Despite the lure of the open solid fuel fire, and I do not in any way underrate the importance of the supply of such solid smokeless fuel to our industry, it is my view that in the long-term with improved living standards and full employment the solid fuel fire will eventually give way to the pipe conducted fuel. Obviously, even with continued improvement in living standards the change-over would be gradual and there would be time for the industry to adjust itself to changing conditions.

The whole subject of smokeless fuel supply is one which is engaging the industry's attention very particularly at the present time with the background of the Beaver Report. It is not, however, intended to emphasize at this stage the part which the industry should play in the supply of solid smokeless fuel, but rather to look ahead and discuss the means by which the industry can meet its base load and the space heating load with minimum cost and the maximum degree of satisfaction to the consumer.

It is, I think, particularly interesting to discuss this in Scotland where there appears to be a greater change in load factor than in any other area board, although at the same time the conditions in Scotland have a very long way to go before they get as difficult as, say, the North Western, North Thames, or South Eastern. It is appreciated quite clearly that the conditions in Scotland are not necessarily the same as those in any other area board with a fully inter-linked system, and it would be quite unfair of me to try to portray the conditions which would be suitable for a fully inter-linked system like the North Thames and suggest that they should be suitable for all the conditions in Scotland.

The whole success of meeting space heating loads is to develop gas production plant with minimum capital costs which we can afford to have standing idle over a large portion of the year. In all our attempts up to the present to do this we have had to use more expensive raw materials than those we use for base load gas, and in all cases peak load gas is more expensive than base load gas. We have then to consider the effect of this increased cost of peak load gas when spread over all the gas produced, and even in the area board with the very worst load factor—that is the North Thames Gas Board—the result is not disastrous. We have really got to look at this business from the point of view of supplying a service to the public for I don't think that the industry can really select the heating purpose for which its product shall exclusively be used, such as the cooking load and high load factor industrial load, and disregard entirely the loads which are not remunerative for there is always a danger that our refusal or unwillingness to supply a space heating load might prejudice our more remunerative loads. At the same time, too, we must have regard to the effect which our supply of space heating gas at increased production costs has upon the competitive position of our base load gas in relation to other fuels.

We require, therefore, to produce peak load gas as efficiently and cheaply as possible, but it is obviously advantageous to spread the space-heating peak load over as long a period as possible and to increase its volume over that period as much as possible if only to make the job more manageable on the works. Now this latter advantage can be met to a certain extent by the policy which our commercial people follow and by the type of appliance which they sell. The industry will get better economic results and more efficient overall operation on the works from the space-heating appliance which is used from September until March than it will from the appliance used for the odd fortnight per annum. There is a greater attraction, therefore, to the industry in the built-in gas fire in the living room or lounge which takes the place of the usual solid fuel fire. There is, of course, an attraction to the industry in central heating where that central heating is used over a reasonably long period of time.

It is recognized that a goodly proportion of the gas in Scotland is produced in relatively small isolated units and we must not leave these out of our considerations. I think, however, we should consider first the conditions which are applicable to the bigger sized units perhaps at Edinburgh, Glasgow, Dundee, Aberdeen or even at Inverness with its remarkable growth over the last few years.

In any survey of the costs of gas production by different processes the influences of the price trends and relative values of raw materials used and the residuals produced are of major importance. Throughout the long heritage of the gas industry in Britain gas has already been regarded as the principal product and in the early days of the industry's development coke was regarded as a waste material. Consequently, the basis of the costing system adopted by the industry has been such that the price of gas has had to carry practically all the manufacturing expenses associated with the carbonizing plant, the purification system and the general overheads. Gas coke has for the last few decades commanded a price only slightly higher than coal.

In the gas industries of other countries in Europe and in the United States the importance of coke has been considerably greater and, in general, it has commanded a price much higher than that of coal. This also applies in the steel industry where metallurgical coke is the primary product and gas is regarded as of secondary importance. It is interesting to find that in Germany the ratio of the price of coke to the price of gas is over 50% higher than in this country; in the United States, where plentiful supplies of natural gas exist this ratio is approximately six times higher than in Great Britain.

(Dr. Burns then mentioned graphs which showed: (1) The increase in the average price of coal as delivered to the works of the Gas Light and Coke Company and subsequently the North Thames Gas Board over the last 20 years; and (2) the relative influence of increases and decreases in the price of coal and coke upon the price of coal gas. The first showed that the net revenue from coke had remained almost exactly in step with coal price.)

This trend has had a marked influence on the industry's economic structure and has been one of the factors making it necessary for the price of gas to be raised disproportionately in comparison with some other fuels. Quite clearly, however, if coke is to command a higher price than coal it behoves the industry to see to it that those qualities which lie within its power to control, namely freedom from breeze, good grading, and a reasonable moisture content, are not allowed to deteriorate.

The other figure shows the relative influence of increases and decreases in the price of coal and coke upon the price of coal gas. The figures are based on a coal gas yield of 72

* From a paper presented at the Autumn Meeting of the Scottish Association of Gas Managers, Inverness, September 22, 1955.

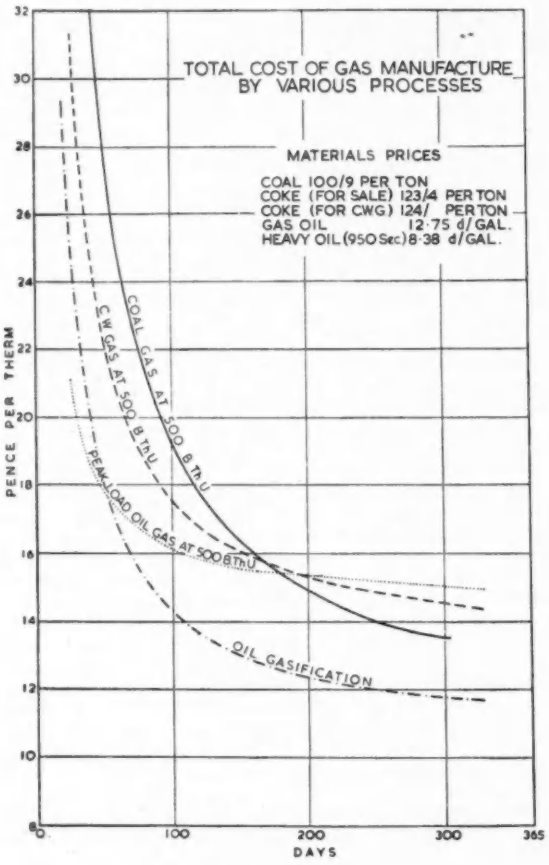
TOTAL COST OF GAS MANUFACTURE BY VARIOUS PROCESSES
MATERIALS PRICES
COAL 100/9 PER TON
COKE (FOR SALE) 123/4 PER TON
COKE (FOR CWG) 124/ PER TON
GAS OIL 12·75 d/GAL.
HEAVY OIL (950 Sec) 8·38 d/GAL.
COAL GAS AT 500 B Th U
C.W. GAS AT 500 B Th U
PEAK LOAD OIL GAS AT 500 B Th U
OIL GASIFICATION
PENCE PER THERM
DAYS

Fig. 1

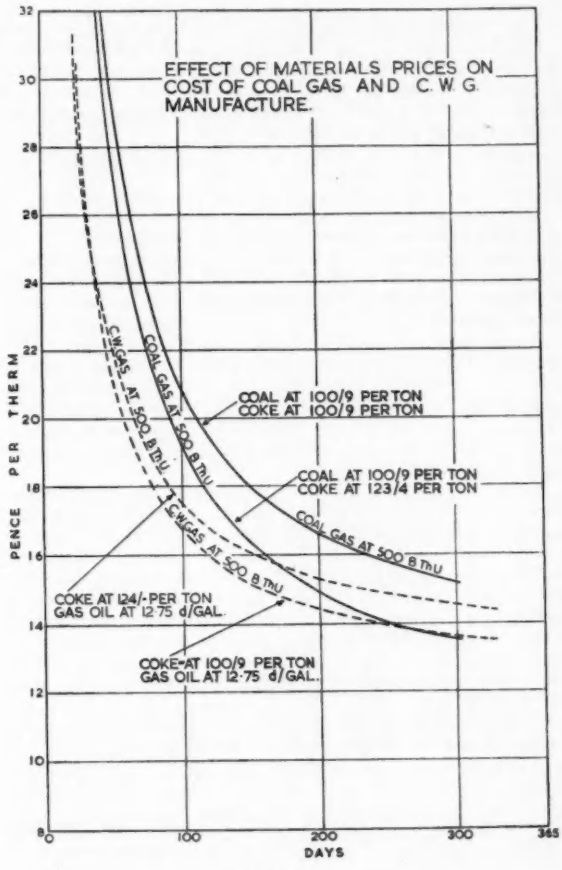
EFFECT OF MATERIALS PRICES ON COST OF COAL GAS AND C.W.G. MANUFACTURE.
COAL GAS AT 500 B Th U
C.W. GAS AT 500 B Th U
COAL AT 100/9 PER TON
COKE AT 100/9 PER TON
COAL AT 100/9 PER TON
COKE AT 123/4 PER TON
COAL GAS AT 500 B Th U
C.W. GAS AT 500 B Th U
COKE AT 124/- PER TON
GAS OIL AT 12·75 d/GAL.
COKE AT 100/9 PER TON
GAS OIL AT 12·75 d/GAL.
PENCE PER THERM
DAYS

Fig. 2

therms per ton at 521 B.Th.U. and 8.85 cwt. of coke per ton available for sale to the public. It shows that an increase in the price of coal of 6s. per ton will raise the cost of gas production by 1d. per therm; this could be offset by increasing the price of coke by 14s. per ton.

All these factors have got to be considered when investigating the best type of plant to install to meet various loads and increments of loads throughout the year. When Mr. Clark and I looked at this problem in 1951-52 we were able to consider only three types of gas production units, namely, the coal gas plant, the carburetted water gas plant, and the peak load oil gas plant. Since that time, however, the possibilities of producing gas from various grades of oil have been developed to a very much greater extent and we can superimpose upon our charts gas production from oil gasification plants such as the Segas plant or the ONIA-GEGI plant. In this case the economics are very much simpler for there is one product only, namely gas, and the economics are dependent primarily upon the cost of the raw material. In the illustration given in Fig. 1, oil (950 seconds) is taken at 8.38d. per gal. and the maximum load factor on the plant is taken at 90%. Obviously, we still have quite a lot to learn on the processes of gas production from heavy oil, and the curve for heavy oil shows the values on which the decision was based in the North Thames Gas Board to put down several plants of this type including Segas units and ONIA-GEGI units. We have still to learn whether our estimated costs are likely to be realized, but we appreciate also that the production costs of gas from oil are very dependent on the market price of the raw material. Further changes in oil price by even fractions of a penny can materially affect the cost of gas production and its relative position to other production processes.

Fig. 1 also shows representative samples of coal gas, carburetted water gas, and peak load oil gas curves. The maximum load factor for coal gas is taken at 83%, for carburetted water gas and peak load oil gas 90%, these values being obtained from experience of the length of time which representative plants are likely to be out of commission for repair and maintenance during their lives. The relative positions of these curves are very dependent upon the values taken for the price of the raw materials into the plant, and in the example shown in Fig. 1 coal is taken at 100s. 9d. per ton, which is the average price paid for coal in the North Thames Gas Board following the increases announced in July of this year, and in the case of the carburetted water gas curve the value of coke into the plant is taken at 124s. per ton. The cost of gas oil is 12.75d. per gal.

In order to exemplify the very considerable bearing which raw material prices have on the choice of process Fig. 2 has been prepared. This compares the load factor/cost curves for coal gas and carburetted water gas with coal and coke at 100s. 9d. and 124s. per ton respectively as in Fig. 1, with the corresponding curves if coal and coke were at the same price of 100s. 9d. per ton. Under these latter conditions carburetted water gas is cheaper throughout the whole range of load factor, and such relativity of raw materials and products must be taken into account very clearly and concisely when determining the type of plant to put down. All the above costs for carburetted water gas are based on the exclusive use of gas oil; these costs can be improved by the use of heavy oil and quite successful operation is being achieved with up to 40% of heavy oil injected into the generator. Such operation reduces the cost of gas production in the carburetted water gas plant by approximately ½d. per therm.

The above sets out the broad principles of choice which are available generally to the bigger undertakings who have to reach a decision on the most suitable type of plant to put down. In many cases, however, particularly in Scotland, the gas industry exists in relatively small isolated units where the actual load increase in the winter-time is not very great and where it would not pay to put down any very large capital investment for use during short periods in the year. Under these conditions it is worthwhile looking at the means which the industry has for increasing output from its existing plant at times of

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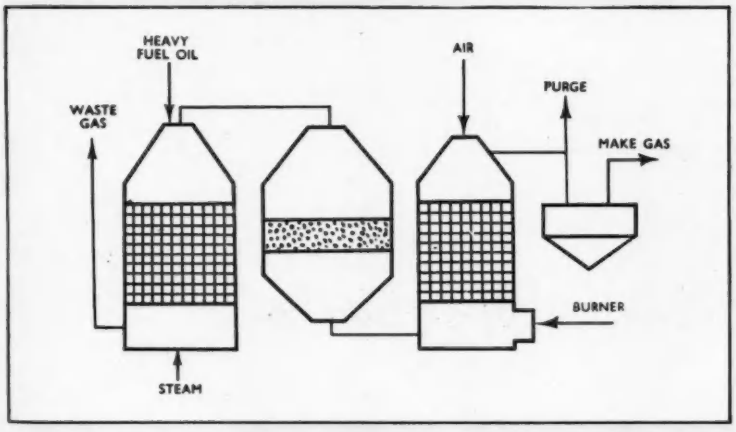

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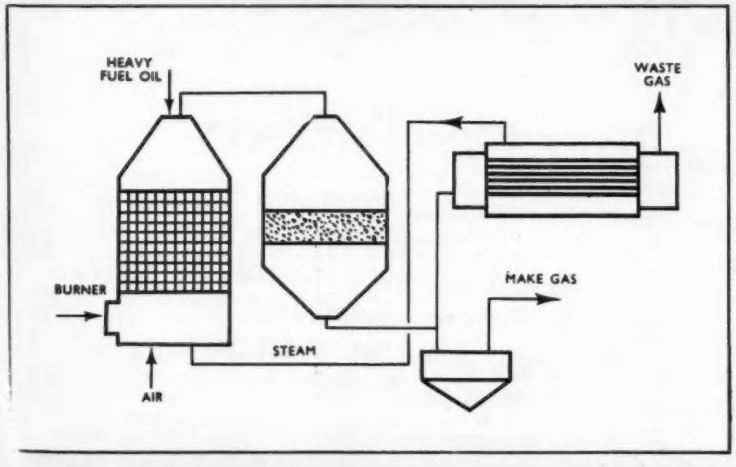
The Humphreys-Glasgow Regenerative Onia-Gegi Catalytic Oil Gas Plant is currently producing 1.37 Therms of 450 B.Th.U. Town Gas per gallon of '1000 seconds' Heavy Fuel Oil and using its own Oil Gas Tar for heating.



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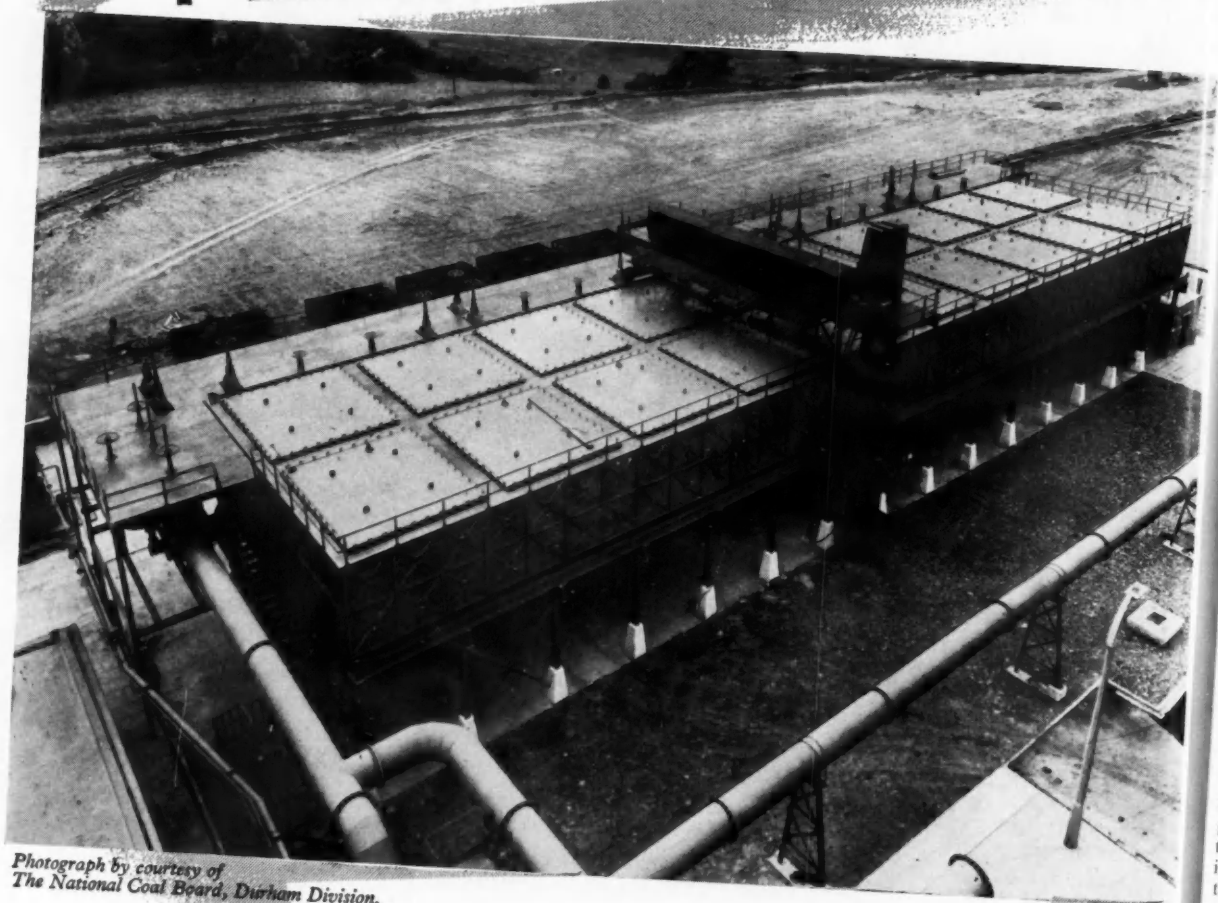

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The National Coal Board, Durham Division.

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heavy demand. Quite clearly, too, these methods are also available to the bigger undertaking but may not be sufficient to meet the full requirements of heavy load in the winter. These methods include:—

(a) Closing scurfers on carbonizing plant.
(b) Increasing the oil gasification in existing carburetted water gas plant and using blow gases as the diluent to produce gas at the same calorific value.
(c) Increasing oil gasification in carburetted water gas plant and increasing thereby the calorific value of the gas produced.
(d) The by-passing of benzole plants to increase the calorific value of the gas produced.
(e) The vaporization of benzole into the gas in order to increase calorific value.

(a) Closing Scurfers.

There is probably very little necessity for me to talk about the effect of closing scurfers but, nevertheless, this is a useful and admissible method of increasing gas production at times of heavy demand, provided always that the normal scurfing programme is well maintained at other times. Experience in my own Board goes to show that the effect of closing scurfers in continuous vertical retorts increases the output by approximately 8%. In the case of horizontal and intermittent verticals the increase is 4% with 2% increase for coke ovens. With the mixture of plant in the North Thames Gas Board, it is found that the effect of closing scurfers the first day is to increase gas production by 3%; this increases to 5½% on the second day; and with the scurfing programme normally employed it is possible to maintain this increase for approximately one week. The cost of providing this extra gas is small and depends only on the net cost of coal and the labour charges.

(b) High Peak Carburetted Water Gas.

The North Thames Gas Board is at the present time proposing to install equipment in some of its water gas plants which will allow it to gasify an increased quantity of oil in the carburettors of its Humphreys and Glasgow plants and to provide the heat for so doing by burning oil during the blow period. A portion of the blow gases is diverted into the make in order to bring the calorific value of the gas produced down to 500 B.Th.U. By this means it is hoped to increase the output of a carburetted water gas plant by as much as 40%, but the gas so produced is of high specific gravity because of its inert content and the amount which can be permitted in the total gas from the station is limited and is such that the specific gravity from the total gas should not be more than 0.6. The efficiency of the gasification of the additional oil used is in the region of 1.1 therms per gall. and this compares with the result obtained on peak load plants but requires no additional labour.

The cost of producing this supplementary gas from carburetted water gas plants is, therefore, dependent only on the oil usage and a small capital charge for the additional equipment required. On the basis of two week's operation per annum and assuming that the existing purification plant can carry the overload for the short period involved, the cost of this supplementary gas amounts to some 13d. per therm, which figure compares favourably with alternative methods.

(c) Increase in Calorific Value.

Experience has shown that on the whole our consumers use therms rather than cubic feet, and on many occasions it has been shown that the volumetric demand is inversely proportional to the calorific value. In some cases there is the possibility of increasing the thermal output with no means of increasing the volumetric output to bring the calorific value down to district quality, and over the relatively short period of a cold spell it is suitable to increase the calorific value of the gas sent out. This has the advantage of compensating in part at least for the high specific gravity of the gas, which is usually a feature of peak-load output. It is the endeavour, for instance, in the North Thames Gas Board to keep the calorific value of the gas at peak demand as high as possible and work over the declared calorific value so that the consumers' demands may be met by a smaller volume and thus minimize the risk of failure. Calorific value may be increased by increasing the rate of oil gasification on carburetted water gas plants, and in my Board, generally speaking, it is possible to manufacture gas up to 520 B.Th.U. without any serious diminution in efficiency.

(d) By-passing of Benzole Plants.

Another method of increasing calorific value is to by-pass benzole plants where these are at work and to give the consumer the benefit of the increased calorific value. The cost of increasing calorific value by this means is, of course, related directly to the market value of the crude benzole extracted, less the cost of steam which would have been used in the benzole extraction plants. For the London area this cost is in the region of 13d. per additional therm.

(e) Vaporization of Benzole into Gas to Increase Calorific Value.

Finally, there is the possibility of injecting benzole into the gas from a store of material previously extracted. It is found that the gas will carry without deposition a considerable proportion of benzole and certainly sufficient to increase the calorific value by 5% without trouble from deposition in the mains, although care must be taken that the amount injected is not sufficient to cause sooting of consumers' appliances fitted with luminous flames. It is suitable in these circumstances to remove the organic sulphur-containing fraction from the benzole prior to re-introduction in order to minimize embarrassment from organic sulphur compounds when gas consumption is high with very often emphasis on the use of flueless appliances. It is also suitable to remove the heavier xylene and toluene fractions as these are the most valuable fractions of the benzole and would be the first to condense in the distribution system. The cost of providing this additional output of therms is in the region of 19d. per additional therm, and this is a reasonably satisfactory result over the short period that such a process is likely to be used. The extra cost over all the gas sent out per day is, of course, quite small.

Although the data presented in this paper show that the recent rise in the cost of coal has given a marked advantage to oil gasification processes it would be unwise to generalize too far on recommendations for the choice of gasmaking plant for the industry as a whole. Prices of raw materials, revenue returns for residual products, and general marketing conditions vary so much up and down the country that local factors become of major importance in determining the choice of plant and economic policies for any particular district or area. It should not be forgotten that the coal industry still provides by far the greater portion of thermal input into the gas industry and the industry is equipped with coal carbonizing plants which it will have to use for many years. The position is easier when one comes to consider new and additional loads, for the new oil gasification processes are relatively cheap in capital costs and, at the present time, there is a price advantage in the use of heavy oil. We should not forget, however, the value of the carburetted water gas plant as the industry's principal means of balancing the coke market and, to some extent controlling its selling price.

All the changes which the industry is now experiencing emphasize, above all, the need for flexibility of outlook and flexibility of production method.

DISCUSSION

Mr. T. Cameron (Grangemouth) said peak load gas would always be dear and the sharper the peak the dearer the gas. The fact that in Scotland they were experiencing a worsening of the load factor would put an extra cost on to the gas over and above those costs already known. It was disturbing to see that the sales of gas in the high temperature zone was less than it was two years ago, while the low temperature consumptions had risen considerably. It was worse when they thought of the lighting loads they had lost and were likely to lose in the future. The first step was to sell more industrial gas and more water heaters and refrigerators.

From Dr. Burns' figures the North Thames Gas Board seemed to have a better coke-coal ratio than experienced in Scotland. When this was coupled with the higher yields of blue gas they had per units of coke, due to their coke's higher reactivity and, more important, higher fusion points of the ash, the result was that their cost of carburetted water gas was more favourable in relation to coal gas. When considering new plants, and taking all costs into consideration, he had

not been able to make out a case for installing a coal carbonizing plant in favour of carburetted water gas, on financial grounds alone.

The limitations to the use of carburetted water gas were the combustion characteristics at the consumer's appliance. Experience had shown that an installed capacity of coal gas to carburetted water gas of 60% to 40% could safely be used. This was different from the present installed capacity of their area board, which was about 76% to 24%. From Dr. Burns' paper it could be seen that there had been a tendency in Scotland to sell more peak load gas recently. The cost of this gas could be lessened by producing it in this type of well-tried plant with its lower overhead costs.

Although carburetted water gas had its limitations due to its specific gravity there were other complete gasification cases which did not have these drawbacks. The existing Tully gas plant offered the advantages of the carburetted water gas process with less restriction on the amount of mix with coal gas. There were many other systems. The position in Scotland seemed to be that the coal carbonizing plants already in existence could consume all the coal that the Scottish Division of the N.C.B. could give—and more, to the tune of about 200,000 tons brought across the border last year. This coal had an extra carriage cost of £1 per ton, and as there was no reflection of this in the coke price it meant an extra cost of 3d. per therm in the cost of gas made. This made a poor case for building plants which consumed this marginal coal. It might be that the N.C.B. hoped to supply them with all their coal needs from the Scottish coal fields. Far be it from him to dash these hopes, but he would say that they should, in this instance, take the world as they found it. They should endeavour to build plants to consume the coals available in Scotland and make more gas from the coals already supplied. This would mean complete gasification of inferior coals and further gasification of the coal from the carbonizing process. All this should be supplemented by gas from the products of the oil industry. In this way they would help to tilt the cost of the peak load gas in their favour. Unfortunately, went on Mr. Cameron, all this seemed to be contrary to the rôle the industry hoped to play in the initial implementation of the Clean Air Bill, but he believed their main function was to produce as cheap a therm of gas as possible even if it meant producing less coke. If coke had a price ratio to coal of about 1.5 to 1 and coal was available then they could go ahead with more carbonizing plant. Gas was a better fuel than coke. It was the ideal smokeless fuel and produced no atmospheric sulphur.

Mr. E. G. Smith (Glasgow) said that to enjoy Dr. Burns' paper properly one had to re-read Communication 417, to which he had referred, and also his earlier paper, Communication 385. The conditions under the North Thames Board had been set forth frankly and bluntly and with a confidence which made them think of how they stood in comparison. The North Thames Board area differed from Scotland in character but there were many similarities, especially when compared to Central Scotland. Dr. Burns had shown them some graphs but was much too modest in stating their value in respect of atmospheric temperature relationship. The extension of Rose's temperature-load graphs by the addition of the weekly mean atmospheric temperature and expected normal temperature had endowed the graphs with an accuracy of trend, if not of detail. They were more than statistical. They showed the movement of load to capital demand. If Scotland was the worst he would suggest it was due to the fact that the largest undertaking, Glasgow, had been unable to accept and meet large industrial demands because of the lack of gas-making capacity between 1951 and 1955. It had had to confine itself to domestic loads, rightly reserving what was available to the domestic field. With plant now available the position called for a review of industrial and commercial tariffs. In a paper given by himself to the Association in 1952 he had said 'The main advantage (of these loads) lies in a lower capital therm and in the stabilization of costs where a sound industrial and commercial tariff is enjoyed.'

The peak load question was always with them. It was easy to relate the acceptance or rejection of large industrial and commercial loads to load factors and works costs, but when they came to the domestic field they had to remember that they were a public service and had to satisfy their consumers. He agreed with Dr. Burns that they had to accept every load they could in the domestic sphere. Before the war the gas industry survived on a domestic load only. He often asked himself if the big load on the domestic side was really a serious problem, given a balanced sales effort in respect of oven cooking, water heating, space heating and so forth. That was a sales directive more than a technical proposition. They could progress only through sales effort and consumer acceptance in the domestic field, combined with the judicious use of commercial and industrial tariffs.

Dr. Burns' paper was like a serial. Because of ever-changing conditions such as raw material prices it had to be re-written every two years. The comparison of costs in Communication 417 and the paper that day showed a reversal between chamber ovens and continuous vertical retorts. The continuous vertical retorts were now cheaper. On the plant question it was clear that if it took three or four years to get in plant before it was complete market conditions might have changed in the interval to such an extent that one might find one had chosen plant which proved less economic when it came finally into operation. They had to remember that in large manufacturing units carburetted water gas and oil gas plants were complementary to coal gas plants and all their developments had to be considered in relation to existing plant. In Scotland they were not so free in their choice. In Glasgow they had given consideration to the question of coke ovens but had dismissed the project because of the lack of coke and coal. They had to recognize the danger of choosing plant which was selective in the coals it would use, and therefore continuous vertical retorts remained for Scotland the only unit responding to the wide variety of coals supplied. They were receiving coals from Poland and one of the Glasgow works was operating 100% on coal from England. He had no practical experience of oil gas but had read many papers on the subject. The recent increase in freight and coal charges had extended geographically the economic range of its application.

Nobody could safely prophesy. Coal and oil prices did not rise and fall in sympathy with each other, and if there was no difference in cost it was better to choose low capital plant even with high direct labour charges. Capital was important to them in Scotland, where they had the incidence of rating which imposed an added penalty.

What of liquid gas? Reference had been made to it at Ayr. A supply of it from the United States might save so much per therm in large undertakings, but in Scotland they had many small undertakings where labour difficulties were considerable and where they could not control quality because of the size of the plant. He hoped that the supply, if it came, would not all be absorbed by the North Thames Gas Board but would be made available also to small undertakings.

Mr. D. C. Elgin (Edinburgh) said that the phrase 'You can always tell a Scotsman but you can't tell him much' was often applied in irony, but it was obvious that day that there was little Dr. Burns did not know about the best way of matching up the equipment of a gasworks and its operation with the pattern of consumers' demand. He was naturally interested in the Scottish position regarding the load factor as it had been shown in one of Dr. Burns' graphs. He wondered if part of the answer to the apparent deterioration in load factor lies at the higher temperature end of the graph. It was possible that holiday periods would coincide with the higher temperatures. In the English areas major holidays occurred together. Here the main towns and cities had different weeks. In plotting straight line graphs the English holidays would be obvious and perhaps legitimately ignored. In Scotland they had a longer influence, and it was of interest that the variation due to holidays alone seemed in certain places, to be more violent than formerly. Applying a factor to take that into account it was possible to reduce the fluctuation between 65 and 30 degrees from 50 mill. per week to about 30 mill. per week. But even that left them with a good deal to think about with regard to the type of load they were attracting. From this and previous work by Dr. Burns they knew the approximate cost to them of loads of various kinds as they were influenced by load factor. From market research revelations they had an idea of potential loads in various fields.

Mr. Elgin was less clear about the relative vulnerability of those markets to gas, what the economists called 'elasticity of demand.' In other words, if they could cut the price of gas by 2d. per therm, say, or hold it by that extent relative

to competitors, would it have an effect on load? If it did, would it be general or merely confined to one field, say intermittent space heating, which would benefit them little in the long run? Tariffs and publicity should take care of that but their effect was not absolutely predictable.

The calculation of 4d. on price was too simple for words if they forgot the depressive effect. But he would like to think that the other extreme—3d. off—would require something additional to a straight multiplication. If that was not the position now they could be in trouble. The finest weapon in the sales force was price.

Coke was an economic weapon. Let them fix the equilibrium price for it based on average supply and demand over an adequate period. Much had been said about a one-fuel or two-fuel industry, but Mr. Elgin hoped that it was to be a one-fuel industry the fuel would not be coke.

Mr. G. Wood (Galashiels) said that Dr. Burns had pointed out that the space heating load was a good load if spread over as long a period as possible. The Scottish Gas Board had introduced a rebate on gas based on a good load factor. A rebate of 5% was payable if the average monthly consumption was not less than 90% of the maximum consumption in any one month. A case had recently come to his notice of a large consumer who used gas for cooking, hot water and heating. On the basis of that consumer's present monthly consumption he paid an average over the year of 14.9d. per therm. If he did not use gas for space heating it was possible that he would then have a good load factor and would qualify for a 5% reduction in his gas account. It was estimated that on that basis he would only pay an average of 14.25d. per therm for the gas consumed over a year. Dr. Burns had shown that the load factor in Scotland was very good compared with many of the other Boards and, taking that into consideration, it might be a mistake to encourage a better load factor with an arrangement which nullified a promotional tariff.

In the summary of the cost per month of different types of gas, Dr. Burns showed all his coal gas as being diluted with blue water gas. He presumed that the blue water gas was made separate from the coal gas, and he would like to know his reasons for doing this in preference to steaming within the retort. Dr. Burns showed that the cost of blue water gas for mixing with coal gas was the same as blue water gas made in a carburetted water gas plant. Would the cost of blue water gas not be more expensive made in a carburetted water gas plant due to the additional heating required to crack the oil?

Mr. F. Oliver (Johnstone) said that Dr. Burns had given them a wealth of information with an economy of words which did credit to his native land. He had said that the industry was now in a position where it could not disregard any load or potential load which it could get fairly and squarely in competition with other fuel. If so, and they were to receive these loads, they had to be supported by a suitable promotional tariff. One could not envisage any appreciable increase in the domestic load but there would appear to be a distinct possibility of the industrial load being increased. If they were to receive that business, however, they could no longer expect the large consumers to subsidise the very small consumer who was nearly always supplied at a loss. Provided there was a sufficient margin between the cost of supply and the revenue received from the additional therms sold it should be in the Board's interest to accept these extra loads. They had also to ensure that any further increase in the price of gas should be curtailed to a minimum and even then only when they were satisfied that the maximum possible price was being received for coke.

Dr. Burns had expressed the need for a policy involving maximum flexibility of outlook and of production methods, but rather than proceed with such an interim policy should they not try, at the highest level, to determine a fixed policy which they could pursue with real purpose? There was a distinct possibility that the coke produced for sale from the currently installed carbonizing plants might no longer be in demand before the capital value of the plant had been written off. It would therefore appear, as a temporary expedient, that there might be a case for the accelerated carbonizing processes to meet the additional demands for gas until such time as a concrete policy on future production units had been determined. They were continually being reminded that the level of recruitment into the industry was inadequate at present. Was it not possible that it was due to the lack of a definite policy?

Dr. Burns, replying to some of the points raised, said that the millions of tons of coal burned in households had to be displaced by solid or gaseous smokeless fuel. Whence would the coal come from which to make it? To meet the requirements of the Beaver Report might mean the industry's ability to produce a solid smokeless fuel from the coal now being burned in smoky fires in households. Mr. Smith had spoken of promotional tariffs and there was a lot to be said for them and a lot of research was needed. They did not require to worry much in Scotland about their peak load. They had a long way to go before they would get into difficulties. But they had to make up their mind some time that they had to meet the load and would have to consider what the fuel situation was likely to be with regard to oil. It might be advantageous for the gas industry to utilize the oil which the oil companies could not dispose of otherwise. He had purposely omitted any reference to liquid gas because at the moment the subject was only half-baked. There was material going to waste in the world's oil-fields, and its use here might have a tremendous effect on the fuel economy of the country if they could overcome the technical problems. There would be no regasification problem but the real difficulty was transport.

Dr. Burns said that many loads were obtained by simply giving better service. On equipment they had preferentially to select the plant which gave the cheapest gas. Mr. Oliver had suggested a fixed policy instead of one giving some degree of flexibility, but a fixed policy, say, regarding oil might well land them in difficulties.

STANDARD FOR SOLID FUEL BURNING BOILERS

A revised British Standard (B.S. 758:1955) has just been published. It applies to small boilers designed for use with solid smokeless fuels, with a rated hot water output of not more than 55,000 B.Th.U. per hour. These boilers are primarily intended for use in direct domestic hot water supply systems. Requirements for range, fireback, hopper-fed, thermostatically-controlled boilers and boilers of special design are not included. The rating, fuel capacity, heating surface and certain details of construction are dealt with in Part 1, together with minimum standards of performance. Part 2 gives details of the four type tests required to determine the performance, and Part 3 a specimen report form.

B.S. 758 was published originally in 1937 and revised in 1945. The main differences between the new revision and the 1945 edition are that the performance tests are now a mandatory part of the specification and minimum standards of performance are specified; the lower limit of 2 sq. ft. of heating surface has been withdrawn and the section dealing with installation no longer appears since the subject matter is now covered in British Standard Codes of Practice: C.P. 403:101, 'Small Boiler Systems Using Solid Fuel'; C.P. 131:101, 'Flues for Domestic Appliances Burning Solid Fuel.' Copies of this standard may be obtained from the British Standards Institution, Sales Branch, *2, Park Street, London, W.1,* price 5s.

GAS COUNCIL DRAMATIC SOCIETY

On October 17, 18, 19 and 20, at 7.30 p.m., the Gas Council Dramatic Society will present at the Chanticleer Theatre, Clareville Street, London, S.W.7, a comedy in three acts by Philip King entitled 'On Monday Next.' Prices of admission are 7s. 6d., 6s., 4s. 6d. and 2s. 6d. and tickets may be obtained from Miss J. Bolton, Coke Department, 1, Grosvenor Place, London, S.W.1. Previous productions of the Society have been of a very high entertainment standard and the most recent have certainly enhanced this reputation. A great deal of hard work and enthusiasm is put into these productions by all concerned, and it is hoped that the play shortly to be presented will have a record attendance.

Domestic Fuel for Smokeless Heating*

By G. E. FOXWELL, C.B.E., D.Sc., F.Inst.P. M.Inst.Gas E., M.I.Chem.E.

THE report of the Committee on Air Pollution postulated that if the air above industrial or heavily populated districts is to be cleaned adequately, smoke from the domestic chimney in those areas must be virtually eliminated. Ultimately, domestic smoke should be eliminated or greatly reduced in other areas also, but priority must be given to the black areas.

Legislation dealing with domestic smoke must be permissive and this carries with it the corollary that those to whom the Clean Air Act is applied must be satisfied with the new arrangements for heating their homes. The widest possible choice must be permitted in appliances and in fuels; there will be an increasing number of householders who prefer gas, electricity or oil to solid fuel. (On grounds of national policy the use of electricity for domestic heat is inadvisable over the next half century). Although the use of refined fuels is likely to become more popular as the general standard of living rises and people seek to save domestic labour, the committee visualize that for economic and other reasons the main bulk of domestic heating, and particularly space heating, will be taken by solid fuels for many years to come.

The pattern of fuel utilization laid down in Appendix XI of the Beaver Report is not to be considered as unalterable. It is intended as a practical demonstration based on the evidence of the fuel industries themselves and on that of many other organizations and individuals, that there exists at least one pattern upon which the required fuel can be made available during the next 10 to 15 years, and at a rate of increase that would be reasonable. The overall picture presented in Appendix XI of the Report is given in Table I.

Carbonization

On this pattern, it would be necessary for the industries concerned to carbonize an additional 10 mill. tons of coal a year, and this would give rise to some 800 mill. therms of gas for

TABLE I

	Coal replaced	
	Closed stoves mill. tons	Open fires mill. tons
Coal to be replaced	3.80	15.20
Replacement (in terms of coal replaced) by:		
Anthracite and smokeless coals yielding less than 20% V.M.	2.53	—
'Hard' coke (oven coke)	0.75	1.43
Gas coke transferred from other users	0.52	3.75
Electricity	—	1.38
Gas coke, new production	—	5.00
Gas, new production	—	3.64
	3.80	15.20

which a use must be found. We have suggested that 360 mill. therms would be used to replace house coal for water-heating, bedroom and other intermittent heating, and short period space heating, the remainder being used by industry. The gas industry has accepted the view that the main task of providing the fuel will devolve upon it.

Some observers, looking at the undoubtedly grave situation have doubted whether the additional 10 mill. tons of coal can be made available for carbonization. There is an adequate reply to this scepticism. In the first place, the coal needed is not additional to present production, but is purely a replacement in that coal now burnt would be carbonized. Since the products of carbonization can be used with much higher efficiency in domestic appliances than the coal now burnt on the older forms of coal burning grate, a substantial economy in coal should be achieved.

The major consideration is the alleged shortage of carbonization coal. We have to provide enough good metallurgical coke for expansion of the steel industry and in addition nearly 40 mill. tons of coal for the production of gas and coke for domestic heating and other purposes. Fortunately, the lower-rank coking and gas coals produce more reactive coke, coke better suited for domestic purposes, than the first quality coking coals required for making metallurgical coke. Sources of the additional 10 mill. tons of carbonization coal are as follows:

(1) More than half of the large coal now used in this country consists of cokeable coal and a large proportion of this is of types 500 and 600, peculiarly suited for carbonization.

(2) The combined effect of replacing domestic coal under the clean air programme and steam locomotives under the railways reorganization programme will be that the present uses for large coal will disappear within a period of 10 to 15 years. The whole of the additional 10 mill. tons of carbonizable coal needed for the clean air programme could be obtained from this source.

(3) Millions of tons of cokeable coal are now burnt under boilers or used in similar ways for which non-coking fuel or oil would be an adequate, indeed advantageous, replacement thus releasing the coal for carbonization.

(4) Blending coking coals with weakly coking coals is a recognized method of making a reactive coke.

The gas industry is examining the extent to which more coke could be made available by such means as the use of coal in water gas plants, the replacement of water gas by oil gas, and the replacement of coke by non-coking coal in producers for firing gas retorts, while renewed interest is being shown in the manufacture of reactive domestic coke by carbonizing doubles or larger coal in continuous retorts.

It is not sufficient to produce enough coke. The coke produced must behave in a 'lively' manner on the fire and have the necessary composition and structure to give it that property. The carbonizing industries must produce coke of the right quality if the consumer is to be satisfied with the conversion. Upon the reactivity of the coke will depend whether or not it is easy to ignite, whether after the fire has burned low it can be revived quickly and whether a comparatively small fire can be sustained. It is essential that all old coal burning appliances should be replaced by modern appliances.

The problems in the supply of solid smokeless fuel can be summarized under the following heads:—

(1) Sufficient fuel for open fires and closed stoves must be made available at the rate at which smokeless zones and smoke control areas are instituted, the full 'black area' total of replacement for 19 mill. tons of coal being completed in 10 to 15 years.

(2) The solid smokeless fuel supplied to these zones must be of sufficient reactivity to give satisfaction on the open fire; this applies to coke made available from existing sources as well as to new production.

(3) The ash content of the fuel must be reasonably low; this will entail the provision of more coal cleaning facilities at the pits.

(4) Additional carbonizing capacity must be provided at a cost which 'would be counted in tens of millions of pounds and not in hundreds of millions' (*c.f.* Henry F. Jones, *Financial Times*, May 24, 1955).

From this discussion two points emerge which are here emphasized particularly:

(1) The Beaver Committee's estimates were based on the minimum cost at which existing appliances could be replaced by solid fuel appliances burning coke. The increasing cost and scarcity of coal and the resulting heavy cost of coal imports are now a strong argument for facing the additional capital costs entailed in installing free-standing appliances of higher efficiency in order to save domestic fuel.

(2) The rate of institution of smokeless zones and smoke control areas must be co-ordinated with the supply of suitable fuel. The conditions of last winter led to widespread complaints of coke shortage. This was generally due to a back-log of orders far in excess of the capacity of staffs and vehicles of the distributive trade.

* From a paper to the 22nd Annual Conference of the National Smoke Abatement Society, held at Bournemouth from September 28 to 30.

Power Problems in Gas Manufacture and Distribution*

By Bernard Wilkinson, B.Sc.(Eng.), M.Inst.Gas E., M.Inst.F.,
Divisional Planning Engineer, Eastern Gas Board (Watford Division).

The author deals with the methods of distributing gas to the two new towns of Stevenage and Hemel Hempstead. In the case of Stevenage there was little existing plant and a free choice of method existed, whereas as Hemel Hempstead there was some surplus trunk main capacity which it was desirable to use, and in addition, due to the location of early development in the new town, the feeder mains and trunk mains were combined. As diesel engines are being used to an increasing extent in the gas industry and in industry generally, some information on their use and economics is included. In a final section the author reviews the preliminary investigation into the power position on a medium size works where for many years a continous increase of the electrical load has been taking place and steam has been used at boiler pressure for all purposes. With prospect of a further steam producing plant, it became apparent that more steam was becoming available than could conveniently be used.

THE new Stevenage is being developed to the south of the old town and is divided by the railway line which runs north and south. To the west of the railway is 400 acres of industrial zone, and to the east the residential zone which will comprise six spaced neighbourhoods, one of which will incorporate the old town. The new holder site lies in the middle of the industrial zone. The distribution of gas from the holder station will be by means of medium pressure feeder mains. This method was chosen as it is economic for the town as planned and yet capable of expansion, should the town development exceed that at present envisaged. The economics of the method were dealt with in Mr. Evetts' paper to the Institution in 1952.

The estimated peak demands in 1,000 cu.ft. per hour are:—

	Sunday	Weekday
Domestic	290	170
Commercial	12	60
Industrial	60	174
	362	404

These loads are expected to require the following pressure condition in the residential area when the holder is in the inner lift:—

	Sunday	Weekday
Pressure required at inlet district governors (in W.G.)	8.0	8.0
Friction loss	21.0	12.8
Outlet booster pressure required ...	29.0	20.8
Holder pressure—inner lift	6.0	6.0
Pressure rise required	23.0	14.8

The industrial area is fed by the medium pressure mains with the branch to the factories connected a short distance from the holder station and such pressures as are required by the residential area on a weekday should also be adequate for the factories.

Booster Arrangement

Both on Sunday and weekday, the peak volume is expected to reach 400,000 cu.ft. per hour, but on Sunday 23 in. W.G. pressure rise will be required wheras on a weekday only 14.8 in. W.G. The possibility of series boosting was considered, but instead of two 12 in. W.G. pressure rise machines, we thought in terms of two 15 in. W.G. machines, and by so doing one machine would handle the weekday peak under all conditions and the second machine would operate for only a few hours on a Sunday. This arrangement is summarized below as Scheme 1.

The alternative method would be to use one booster capable of the weekday load and a second which, placed in parallel, could alone cope with the Sunday load. This is summarized as Scheme 2. With either scheme a standby diesel driven booster capable of meeting any likely load must be included to ensure that gas pressures are maintained in the town in the event of electricity or any other failure.

Scheme 1.—One variable speed booster 400,000 cu.ft. per hour 15 in. W.G. pressure rise in series with one of similar capacity at constant speed and also a standby diesel driven booster of 400,000 cu.ft. per hour at 30 in. W.G. rise.

Scheme 2.—One variable speed booster 400,000 cu.ft. per hour at 15 in. W.G. rise in parallel with a 400,000 cu.ft. per hour 30 in. W.G. machine at constant speed drive with a third machine of 400,000 cu.ft. per hour at 30 in. W.G. diesel driven for emergency purposes.

As a booster to pass 400,000 cu.ft. with 30 in. pressure rise is only likely to differ from one giving 15 in. W.G. rise in the speed and power applied, the only saving in capital is on motor size; in this case a matter of under £200, which would be more than offset by the additional cost of the more complicated connections.

As no particular advantages were evident in series boosting, it was decided to adopt the more conventional method of Scheme 2 with the immediate installation of a booster to give 15 in. W.G. rise and the standby diesel 30 in. W.G. rise, leaving a space and connections for the other 30 in. W.G. machine to be installed when the town grows sufficiently to make it necessary.

Speed variations of the 15 in. W.G. machine will be incorporated for economy in power as this booster will operate with full development of the town for 8-10 hours per day and on a low load factor. The methods of speed control considered were: an A.C. commutator motor, adjustable fluid coupling, and grid controlled mercury arc rectifier driving a D.C. motor. The rectifier method was selected as being the most efficient, the most amenable to remote control and yet not likely to incur heavy maintenance. The efficiency expected of such a unit is:—

	Motor %	Rectifier and Transformer %
Full load	90.5	93
¾ F.L.	90	93
½ F.L.	87	92
¼ F.L.	80	90

The length of time, however, that the unit will be loaded even as high as ¼ F.L. will be relatively short as with a fan the load is approximately proportionate to the cube of the speed. A scoop controlled fluid coupling would give a better efficiency at full load, but compared with the grid controlled rectifier the efficiency falls off on light loads. Efforts were made to determine the load curve as it would be at ultimate development in order to assess the capital which might economically be spent to achieve an improved efficiency but too many assumptions were necessary with regard to the local industrial loading for this to have any real value.

It is intended that this boosting unit should be left permanently on-line, being brought into action, varied in speed, and shut down automatically to maintain a predetermined pressure at some remote point on the system it feeds. The

* Paper presented to the Eastern Section of the Institution of Gas Engineers at Sheringham, September 19.

larger machine—*i.e.*, the one giving 30 in. W.G. pressure rise, which will be installed later, will be driven by an A.C. squirrel cage motor with automatic direct-on-line starter actuated by a time switch.

A diesel driven machine started automatically is essential in any system where the consumers' safety depends on the continued running of a booster, and in this case it will be brought into action either upon electricity failure or upon the approach of a dangerously low level of pressure at the remote point. Once started it will continue to run until manually shut down. That it is running, will be apparent at St. Albans by distant indication, and a visit will be made to examine the cause of start, to shut down and reset.

I have not previously referred to any connection with St. Albans, and I do not propose to go into this part of the installation except to say that there will be certain monitoring, control of volumetric governor, and control of a 140 H.P. compressor motor. The booster operation will, however, be automatic as described above.

Hemel Hempstead Boosters

Hemel Hempstead is a manufacturing station producing on base load 1.5 mill. cu.ft. per day, but as much of this is at present compressed to Chesham and, as at what we term 'ultimate' development, nearly all will be compressed to Berkhamsted and Chesham, it would be simpler for the present purpose to regard Hemel Hempstead as a holder station. The storage capacity is 0.7 mill. cu.ft., but a 1 mill. holder is being constructed, and this will in due course be followed by a second of similar size. Hemel Hempstead works is in fact being developed to provide storage for the new town, the bulk of the gas being manufactured at St. Albans and Watford. The storage of gas near the centre of demand is, of course, a generally accepted principle.

The feed into Hemel Hempstead is from a trunk main into which gas will be pumped at a relatively steady rate, but due to the consumption en route the gas available into Hemel Hempstead will vary, falling on peak to practically nothing. At the Hemel Hempstead end this trunk main is also part of the feeder system of the new town, and as such must be sustained at a pressure sufficient to provide an adequate supply at the far end of the various feeding legs.

The gas to make up the deficit in the trunk-cum-feeder system will be boosted out of the Hemel Hempstead holders and on peak will be required to supply the whole town at such pressure as is necessary not only to supply Hemel Hempstead but to sustain the whole system at an adequate pressure.

Hemel Hempstead town is planned to reach 60,000 population, the same as Stevenage, and the gas demand estimates are also similar, but whereas the industrial load at Stevenage is adjacent to the holder station, at Hemel Hempstead it is mainly on the far side of the town. For this reason full pressure on the outlet booster will be required on both weekday and Sunday, but nevertheless pressure must not be sustained any longer than necessary as to do so would limit the carrying capacity of the incoming trunk.

Speed control of the booster is, therefore, not only a desirable feature for the usage of economy in power, but essential in order to obtain maximum use of the trunk system which is limited at the sending end to 5 lb. per sq. in. There will come a time when the trunk main is inadequate and an additional direct main will be laid from St. Albans.

The booster will be a single stage fan similar to those at Stevenage but running at 4,400 r.p.m. giving 35 in. W.G. rise, absorbing 52 B.H.P. and driven through a gear box by a D.C. motor fed by a grid controlled rectifier. Control will be effected in the same way as at Stevenage—*i.e.*, a distant pressure indicator from a selected point which the booster will maintain at a predetermined value. Again as at Stevenage an automatic starting diesel driven machine will provide against breakdown.

The variable speed booster will, of course, be affected via its distant control by the gas available in the incoming trunk main and when there is sufficient gas coming into the town from outside the control will shut right back, the booster stop, and the pressure build up until released by a surplus valve into the Hemel Hempstead holders. In this way during light load periods storage will be replenished. There will be no holder controls on the surplus valve, and holder stock will be controlled by varying the quantity of gas being pumped into the trunk system from Watford or St. Albans.

Watford Compressors

Watford works is mainly a base-load station, and in order to maintain full output when the new plant at present under construction has been completed, it has been necessary to provide a 10 in. trunk main to pass the gas into the St. Albans-Callowland Hemel Hempstead system. This main is at present being laid, and when complete will be be fed by the same set of compressors which are at present supplying Rickmansworth. There is one 100,000 cu.ft. per hour steam driven compressor which will remain, and three other machines which will be removed as unsuitable and replaced with two sets, capable of 150,000 cu.ft. per hour each, the scheme ultimately being to have three sets of this size to cover an anticipated demand of 300,000 cu.ft. per hour. The design pressure for the system was determined by the existing mains to Rickmansworth at 12 lb. per sq. in.

The choice of compressor was limited by the duty required to (a) multi-bladed rotary, (b) Lysholm screw type, and (c) reciprocator, and further restricted by the space available to either a Lysholm or reciprocator. The multi-bladed rotary is normally regarded as a small machine, but for this volume twin units would have been required, and these could not satisfactorily be accommodated.

The Lysholm is a lobe type machine with two helical lobed intermeshing rotors which rotate within a closely fitting main casing bored out in the form of two intersecting parallel cyclinders. Gas is drawn in at one end as the lobes unmesh, is carried round the casing and compressed as the lobes remesh and is discharged at the diagonally opposite position to the inlet. The speed of rotation varies with the size of machine up to 10,000 r.p.m. Due to the high gas speed these compressors are rather noisy and silencers are desirable. The isothermal efficiency is understood to be over 70%. In this country James Howden & Co. have sole rights, and it is becoming known as the Howden compressor. At least one of these compressors is already at work in the industry.

Although in the Watford Division we are keen to take advantage of any new development, we considered that this particular installation was too important and too large to commit ourselves without more knowledge and experience. It was, therefore, decided to use a reciprocating unit.

Comparison of Compressor Costs

The following table sets out for comparison the cost in pence per therm of pumping gas at St. Albans by diesel and steam prime movers for two sets of conditions under which fuel tests were made.

Conditions	300 r.p.m. and 20 lb. per sq. in. (88% F.L.)			250 r.p.m. and 10 lb. per sq. in. (48% F.L.)		
	Diesel	Steam		Diesel	Steam	
Fuel/steam	0.159	0.273	0.410	0.102	0.168	0.321
Capital charges ..	0.026	0.035	0.035	0.029	0.039	0.039
Maintenance inc. boilers	0.024	0.057	0.057	0.024	0.057	0.057
Attendance	0.007	0.007	0.007	0.008	0.008	0.008
Lubricating oil	0.011	0.005	0.005	0.011	0.005	0.005
	0.227	0.377	0.514	0.174	0.287	0.430
% Exhaust steam utilized		70%	*Nil*		100%	*Nil*

The original invitation to tender specified a unit powered by a relatively high speed diesel engine driving through a gear box. Two firms submitted acceptable quotations, one proposing a 10 in. stroke compressor running at 296 r.p.m. and the other a 7 in. stroke machine running at 510 r.p.m. The 7 in. stroke was naturally the lower price, and with this speed it was thought worth while considering a direct drive from a suitable engine. This resulted in a reduction of the tender by £1,000. This compressor will be capable of 150,000 cu.ft. per hour at 12 lb. per sq. in. with a stroke of 7 in. and bore 21½ in. running at 510 r.p.m. Such a speed for this bore/stroke ratio is higher than it has been usual to employ, but to have installed a machine of lower speed with direct drive would have necessitated a larger engine at considerably greater expense, and the interposing of a gear box with a higher speed diesel would also have been more

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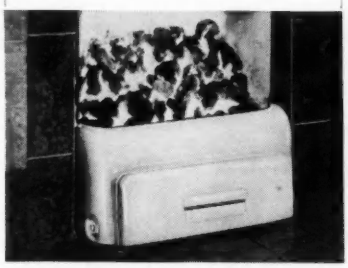

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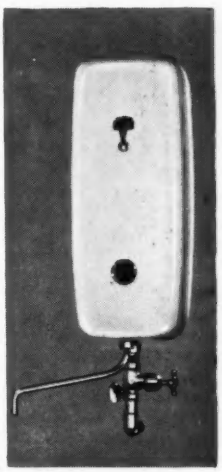

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expensive. Before deciding on the fast running compressor, the makers were asked to submit information on various features of the design, from which it was apparent that the stresses likely to be imposed were well within accepted limits. The anticipated isothermal efficiency is about 63% at full duty, improving with the reduction in output pressure and falling only to 60% when pumping against 4 lb. per sq. in. almost irrespective of the output volume. The tender price for the unit including gas pressure governing through a servo motor was £6,865.

Watford Works Steam and Power

The Watford works consists of 24 beds of eight horizontal retorts with a nominal capacity of 4 mill. cu.ft. per day. There are also two 1 mill. cu.ft. per day hand-operated C.W.G. plants, one of which is normally used for the manufacture of producer gas as diluent. The other C.W.G. set is used only to make gas in the last resort.

Two horizontal benches have a single waste heat boiler each, with no stand-by, and the other pair have one boiler capable of handling the waste gases from both benches with a smaller boiler as standby. There is also a bank of four Lancashire boilers fitted with forced draught for breeze burning.

Electricity is taken from the Eastern Electricity Board at 6.6 kV and distributed at this pressure to local transformers. The works is at present electrified to the extent of 12.5 units per ton of coal carbonized.

No alterations to the carbonizing plant are envisaged but one C.W.G. plant will be dismantled when a complete gasification unit of 2 mill. cu.ft. per day has been brought into regular operation. Whether a second unit is added will depend on the experience with the first. With two units, however, this works would be regarded as fully developed. This works is and will continue to be a base load station.

Complete Gasification Plant

Before proceeding to the examination of the future power arrangements for the whole works, it would be useful to consider how steam and power are to be handled on the complete gasification plant, as these have a bearing on the overall scheme. This plant will include a waste heat and jacket boiler both raising steam at 120 lb. per sq. in. D.S.S. The duplicated turbine driven air blowers and feed pumps will be steam driven, the exhaust passing direct to the plant for process, the steam used on the 'blow' being stored in an accumulator for use during the 'run.'

It will be seen that during the 'blow,' steam will be generated at 202 lb. per minute, and of this 89 lb. per minute will be passed through the turbo-blower to the accumulator; the remaining 113 lb. per minute will be available to the works H.P. main.

During the 'run,' the turbine will require 57 lb. per min., 28 lb. of which will be available from the jacket boiler and 29 lb. will be drawn from the works system. Process requirements during the run will be 112 lb. per min., approximately 55 lb. of which will be supplied direct from the turbine exhaust and most of the remainder from the accumulator. A small quantity of high pressure steam will be bled into the accumulator through a reducing valve. This 'topping up' is necessary to give flexibility and ensure that the accumulator at the end of 'run' is at the correct pressure. A relief valve will also be included.

The accumulator will be a horizontal cylindrical tank 6 ft. diameter, 15 ft. long with, at 75% depth, a water surface area of 78 sq.ft. and volume of 2,100 gal. With such a surface area the ebullition will be at the rate of 44 lb. per sq.ft. per hour, which is well below that at which entrainment takes place. The total weight of steam which will be raised in this plant will be 5,860 lb. per hour, with a net excess of 1,600 lb. per hour at 120 lb. per sq. in. D.S.S.

Steam and Power

When the complete gasification plant is at work, a further 1,600 lb. per hour of steam will be passed into the system which will give a total waste heat steam production above the requirement of the works for most of the year. The effect of a second plant cannot truly be assessed as some degree of enrichment would be taking place, and apart from a reduced heavy steam production, there would be a small quantity required for heavy oil heating. It is not at present thought that the two plants will run simultaneously for long periods, but only on experience gained with the first plant can this be decided.

The solid fuel boilers will be raising even less steam during the year, and at times that produced from the waste heat alone will be more than can conveniently be used. To ensure flexibility one of the following programmes must be followed: (a) Use more steam for power purposes and retain the fuel fired boilers to provide the balance, possibly operating automatically with oil firing. (b) Electrify all prime movers with the exception of the exhausters and install a turbo-alternator to generate in parallel with the Electricity Board's supply and use the 'grid' to give flexibility to the system. The fuel fired boilers would in this case too need to be fitted with oil firing for emergency purposes. (c) Increase the exhaust steam usage so that steam from the waste heat is always sufficient for the needs of the works with the fuel fired boilers converted to automatic oil firing for emergency purposes. In this way flexibility is achieved by varying the degrees of waste.

Scheme I.—Retain steam drive to coal gas exhausters, electrify all other steam drives and install a pass-out turbo-alternator.

Scheme II.—Exhaust all existing steam engines to low pressure main, bleeding excess high pressure into the low pressure main and venting the excess in the low pressure line to atmosphere.

Scheme I, Capital Cost.

	£
Exhaust lines, fan conversion, preheaters, superheaters, etc.	7,150
Oil firing equipment to Lancashire boilers	1,500
Electrification of sundry pumps	1,600
Turbo-alternator and switchgear	21,000
Cooling tower—forced draught	3,500
	34,750

Annual Charges.

	£
Charges on capital at Board's rates	2,380
Net electricity cost	150
Additional maintenance (5% of 21,000)	1,050
Waste heat steam at 7.14d./1,000 lb.	2,820
Diesel oil on compressors	2,140
Total works power costs	8,540

Scheme II, Capital Cost.

	£
Exhaust lines and valves etc.	3,000
Automatic oil firing equipment	2,000
	5,000

Annual Charges.

Charges on capital at Board's rates	240
Electricity at standard tariff	8,500
Waste heat steam at 7.14d./1,000 lb.	2,820
Diesel oil on compressors	340
Total works power costs	11,900

Comparison of Schemes

The apparent annual advantage of self generation is over £3,000. This figure is the result of only a preliminary investigation as information is awaited from supply authority on tariffs. It has been assumed that the purchase tariff will be composed of a fixed charge of £360 per annum in respect of 400 kVA standby with a demand charge on a monthly basis at 10s. 3d. per kVA incurred. The commodity charge has been taken at the highest price on the standard maximum demand tariff block. For selling to the 'grid' a figure of 0.35d. per unit has been assumed.

Tariffs have been negotiated in which 0.33d. per unit plus a fuel adjustment related to the price of coal, has been paid for electricity supplied during night hours and a basic figure of 0.45d. per unit for supplies during day hours. It should be remembered that fluctuations above and below the average daily demand will have an adverse effect on the economics of the scheme, due to the difference in buying and selling prices. The two schemes are still under consideration, and much detail work must be carried out before action can be taken.

DISCUSSION

Mr. W. A. Evetts, M.C. (Chairman of the Section), said the power problems involved in the manufacture and distribution of gas had assumed increasing importance in recent years. The problems were never the same on any two works; each had to be tackled and solved individually. Mr. Wilkinson had been carrying on research on those problems for some years, and all who were concerned in the making and distributing of gas could learn something of value from the paper.

Mr. Henry F. H. Jones (Senior Vice-President of the Institution of Gas Engineers and Deputy Chairman of the Gas Council), said that as one who had had a technical upbringing in matters concerning gas supply he felt the paper was of great value, and he congratulated the author on the way he had tackled a whole series of problems. He happened to know all the works concerned, and could therefore appreciate what the author had done. A wide range of different solutions had had to be studied before pen was put to paper, or any recommendations were made as to what was considered the right thing to do. In these days when the industry had to look ahead and yet keep capital expenditure down it was refreshing and encouraging to see the painstaking way in which these problems had been approached. Many people in the industry talked of selling more gas, and making more gas; if they could not sell it then their work as engineers would be handicapped. The best way in which they could help to sell more gas was to offer it at the lowest possible price.

Mr. A. Allen (Chairman of the Midland Section of the Institution of Gas Engineers), after conveying greetings from the members of his Section, said he supported what Mr. Jones had said. It was very true that planning must be right in these days especially, and that was not easy, because there were so many problems and so many things liable to upset their calculations, and everything must be taken into consideration. They would all agree that Mr. Wilkinson had done that in his paper. The question of electricity on gasworks was very much in their minds, as many members knew they had been installing gas turbines in the Coventry Division. He was not yet able to give any information about their running cost, but it was possible that when they were able to obtain that information it would be very useful to the gas industry.

Mr. C. A. Deas (Area Coke Officer, Eastern Gas Board), referring to the Stevenage booster, said he assumed that authority had been obtained to use the direct-on starter for the booster, the motor of which required about 60 H.P. He asked if any special arrangement had been made with the local supply authority, since a direct-on starter was normally limited to a 5 H.P. motor. He took it that the 60 H.P. motor might be fitted with a back-up isolator, and it would be of interest to know what type of protective system it was proposed to use. He questioned whether the power saving which would result from the machine being fitted with a variable speed D.C. was an economic proposition. Was a diesel-driven stand-by a better proposition than a diesel-driven alternator which would provide a stand-by to both machines in the event of a power failure?

Referring to the Hemel Hempstead booster, Mr. Deas asked whether the D.C. type of speed control was considered economic compared with an A.C. unit equipped with rotor-resistance control. It was interesting to note that the Watford Division was moving towards placing its holders as near as possible to the point of consumption rather than at the point of production. This trend had obvious advantages and would definitely be a move in the right direction. He next referred to the author's cost summary in relation to pumping gas at St. Albans by diesel and steam prime movers. The cost in pence per therm were given as 0.227d. for diesel and 0.377d. for steam, but he wondered whether the costs were really comparable having regard to the high cost of steam production and the fact that the engines were non-condensing.

It was stated that at the Watford works two horizontal benches had a single waste-heat boiler each. It seemed to him that this would mean a serious drop in steam production when a boiler was down for annual overhaul or for other repairs. He thought the cost of a stand-by boiler would justify itself over a period. Discussing solid fuel steam, the author had said that the solid fuel boilers would be raising even less steam during the year. At times more waste heat steam was produced than could be used. This was a common state of affairs and appeared to raise again the urgent need for consideration to be given to the possibility of returning this so-called waste heat to the carbonizing plant. It was said that waste heat steam cost nothing in fuel, but in fact it was produced from high quality coke which today was worth something like 130s. per ton net—coke which was, moreover, a valuable smokeless fuel which would be in greatly increased demand in the implementation of the clean air policy of the Government. Had Mr. Wilkinson given any thought to that aspect of the problem—*i.e.*, the reduction of waste heat steam production rather than the question of developing means for using it?

Reference had been made to the taking of power from the grid, but not enough had been said about the economics of moving towards electricity generation from steam produced by breeze-fired boilers. The tendency towards centralized gas making in large units gave scope for the installation of large mechanically-fired breeze boilers. Centralized gas making would also involve the necessity for pumping increased quantities of gas, in connection with which there were still merits in the steam-driven booster working under condensing conditions. Simpler speed control was possible, and of course the reliability of the steam engine was well known. It was interesting to note that the Central Electricity Authority found it economical to buy breeze from the gas industry for use under its boilers in generating stations.

Mr. E. H. Winch (Divisional Engineer, Cambridge), said the author had described very fully the district requirements in three sections of the Watford Division and the way in which they were met by the use of boosters and compressors. While every district must necessarily have its own peculiarities, the loads and pressure requirements at Stevenage provided an interesting example of the varying demands which could be imposed on a distribution system by a considerable industrial load. In that case it was shown that although the Sunday peak load was only 90% of the week-day peak, nearly 50% more pressure had to be provided at the booster outlet on Sundays because the centre of the Sunday load was more distant.

It would be valuable if more details could be given of the methods of automatically starting up and controlling the booster speed to maintain a fixed pressure at a distant point. Since the domestic and industrial loads at Stevenage were in different parts of the area he wondered whether a single remote pressure point was suitable for both the Sunday and the week-day peaks. Was this remote control the feature which determined the choice of electric prime movers, or was the cost of electricity so low that an electric drive was preferable economically? Alternatively, would the author have felt able to rely entirely on diesel driven boosters in an unmanned station?

The author's observations on the choice of compressors were interesting, particularly his reference to the Lysholm compressor. His comments on the high speed characteristics of that machine were confirmed by recent enquiries they had made in the Cambridge Division where they required to pump considerably smaller hourly quantities over appreciably longer distances, involving pumping pressures in some cases up to 50 lb. per sq. in. A Lysholm compressor for pumping 25,000 cu.ft. per hour at 50 lb. per sq. in. was rated to run at approximately 14,000 r.p.m., with a maximum of 17,000, and at those speeds required all the technical accessories of a normal turbine installation, being equipped with a similar lubrication system, with coolers, centrifuge, oil pressure switch, and other devices to guard against failure. Also, while these machines were no doubt fairly free from vibration troubles, the apparent saving in space due to their small size in relation to capacity appeared to be somewhat misleading because of the large inlet and outlet gas silencers and the large gear-box required if orthodox normal speed engines or electric drives were employed.

They also found that the power requirements were greater than for a reciprocating compressor of similar capacity. A Lysholm compressor for pumping 25,000 cu.ft. per hour at 50 lb. per sq. in. required 800 B.H.P., compared with 63.5 B.H.P. for a reciprocating compressor. Further, the Lysholm machine absorbed 30 B.H.P. when running at 6,400 r.p.m. to deliver only 3,000 cu.ft. per hour at 50 lb. per sq. in., whereas for the same horse power a reciprocating compressor at only 220 r.p.m. would deliver three times as much gas against the same pressure. For similar duties the temperature of the gas leaving a Lysholm compressor would be 450°F., compared with only 250°F. for a lower power reciprocating machine.

The author's comments on the choice of prime movers and the comparison of operating costs were interesting; comparative costs of compressing by diesel and steam prime movers were most valuable. Would it be fair to assume that if Mr. Wilkinson was faced with selecting a complete new installation he would decide in favour of a diesel drive?

Cases recently considered in the Cambridge Division had been rather smaller units, having capacities from 20,000 to 25,000 cu.ft. per hour for pressures up to 50 lb. per sq. in. They had selected reciprocating compressors in each case, with diesel prime movers. Steam engine drives had not been considered because insufficient steam had been available from existing plant. Costs for these comparatively small machines were not favourable for electric drives, the ratio for capital costs from different manufacturers varying between 1.1 to 1.0 and 1.43 to 1.0 for non-flameproof up to about 1.5 to 1.0 for flameproof machines compared with diesel engine drives. In addition the variable speed control equipment for electric motors was rather complicated for the smaller works where plant was to be installed, since highly skilled electricians were not always readily available in such places. Furthermore, the overall efficiency varied from about 72% at full rated load to only 42.5% at the lowest load. They had not yet had any experience of operating the diesel driven compressors but running costs of the various loads were calculated as being only 60% of that for electric drives, taking electricity at 1d. a unit against diesel oil at 1s. 2d. a gal.

With regard to flexibility of diesel engine speed, they had had slight difficulty in obtaining guarantees that they would run satisfactorily for long periods at as low as one-third full speed, and it would be interesting to know the author's experience on that point. Their requirements were a 6 to 1 variation in volumetric loads and it was proposed to achieve this partly by engine speed control and partly by means of an excess pressure governor, or an unloading device on the compressor cylinders, whichever proved most effective.

One disadvantage of diesel engine installations was the necessity to accommodate water cooling tanks where an alternative water supply was not available. These could constitute rather an ugly nuisance. Could the author suggest how this could be overcome; also could he give any guidance on the suppression of noise from diesel engines? Did he consider it necessary or desirable to take any precautions beyond a normal good exhaust silencing system?

Turning to the section on steam and power, Mr. Winch said that in connection with a new continuous vertical installation in course of erection at Cambridge they were following similar principles regarding the use of steam and the generation of electricity from surplus steam for export to the grid. He asked why, in details of steam costs, the cost of waste heat steam for the half year to September, 1953, was 2d. per 1,000 lb. lower than for the succeeding two half years. With six beds shut down for reset during the first period he would have expected the heat losses to have been proportionately higher and the labour charges for boiler cleaning more or less constant, and this would have produced a higher than average cost per 1,000 lb. of steam produced.

Mr. A. D. Duxbury (Leamington and Warwick) said he was sure his chief, Mr. Allen, Chairman of the Midland Section, would endorse his remark that many of the points and indeed the findings of Mr. Wilkinson's paper had been discussed on many occasions in the Warwickshire Division when dealing with integration problems in that Division. In particular the author had referred to the use of medium pressure feeder mains, which were largely used in the developments now taking place in the area. They gave flexibility of action and allowed for unexpected developments either of housing or of industry. With regard to the Sunday and week-day peak loads and their effect on timed boosting programmes, the Sunday peak load was probably of only about half an hour or an hour's duration, whereas the week-day peak loads, due to the requirements of industry, were spread over periods of eight to 10 hours.

In new town development it was a great advantage to have the holder station near to the new factories, provided the pressures required by the residential areas were sufficient. That would not be the case in his own district until all the factories could be fed from medium pressure breakdown governors. He agreed that the storage of gas near the point of demand was desirable, but it was not always possible in a district like Leamington. The practice of utilizing surplus gas in the trunk main system for replenishing holder stocks was similar to that at Leamington, but in their case the system was at present manually controlled. As regards steam, electric, or diesel prime movers he thought steam was 'out' unless exhaust steam could be adequately utilized. Electricity had been installed in a number of instances in the Leamington district for that reason.

The Author's Reply

Mr. Wilkinson said that he would like to thank Mr. Henry Jones for his kind remarks and assure him that he and his colleagues in the Watford Division did watch capital expenditure most carefully. He would be interested in the costs of running gas turbines at Coventry when Mr. Allen could give the figures, as they considered an installation some years ago but it did not seem that the additional capital expenditure above that entailed in a steam cycle was justified by the greater efficiency of energy conversion.

With regard to the boosters at Stevenage he would add that direct-on-line starting for such large motors had been permitted by the Electricity Board in view of the fact that the holder station was adjacent to the sub-station. For electrical protection it was proposed to employ H.R.C. fuses against short circuit faults and thermal strips against overload and single phasing; it was not intended to install any earth leakage protection as such, but to ensure adequate conductivity of the earth return and rely on H.R.C. fuses.

The extent to which expenditure on variable speed gear was justified at Stevenage was very difficult to determine. On a district load of wide diversity an accurate assessment could be made, but at Stevenage, with the volume and pressure not being proportional, it was only possible to make approximations from which it was apparent that the additional expenditure was justified. Rotor resistance control which had been suggested was not as efficient as some of the other methods of speed variation, and it had a less stable characteristic at the lower speeds.

A diesel boosting set for standby purposes was selected in preference to a diesel alternator because when the diesel boosting set started, some pressure was created immediately, whereas with an alternator it would first be necessary for the machine to run up to speed and then automatic switching would take place with the result that some time would elapse before any restoration of pressure was made. Also in the event of booster, gear box, motor and switch gear troubles on the electric drive an alternator would be useless. The capital cost of a diesel booster was just about the same as a diesel alternator. At both Stevenage and Hemel Hempstead a single remote point for control would be suitable, but this would not necessarily apply in other cases. Electric prime movers were selected in preference to diesel, mainly for ease of control.

Mr. Winch asked what drive he would favour if faced with a new installation, and he found this very difficult to answer; there were so many factors to take into account. He agreed, broadly speaking, with Mr. Winch on running costs of electric and diesel, but although diesels were in some places running unattended for weeks on end, he would hesitate to install them for long period running at unmanned stations. In their experience the noise emanating from diesel engines was not excessive. At one works where two 4-stroke 80 B.H.P. engines were running simultaneously, there was considerable noise within the engine room, but outside it the noise was not objectionable, although only the normal straight through silencers were fitted.

Mr. Deas suggested that the reduction of waste heat rather than its utilization should receive more attention. Without reconstruction there was little that could be done about it, and if in a new plant extensive regenerators were incorporated the capital cost would be very high. By the use of regenerators the waste gas losses could be reduced to a low value. However, with such arrangements there would still be need to provide power for works' use and steam for process. Automatic breeze burning boilers would be an economic way of providing power for internal use, but he doubted if they could ever expect to export power in the form of electricity as an economic measure. Finally, he wished to thank Mr. Winch for the information he had given on Lysholm compressors. He would study the figures with interest.

BUILDING IN PRECAST CONCRETE

AT Nuneaton in Warwickshire there has just been completed a new iron foundry, built for Sterling Metals, Ltd., by Beechams Buildings, Ltd. A special method of construction was used, and this involved precasting from reinforced concrete, the structural framing and main walling elements at the works of Beechams Buildings, Ltd., in Shipston-on-Stour. One of the most outstanding features of the building is the amount of unrestricted floor space, which can be seen in the lower right hand illustration. An idea of this can also be gained from the general dimensions of the foundry which has a total area of 200,000 sq.ft. The main block consists of central span of 67 ft., flanked by two spans on each side of 50 ft. each, and the internal columns supporting roof and crane beams are spaced approximately 33 ft. apart.

The roof frames are precast in two half arches as a single L-shaped member with a leg or vertical section and a rafter at an angle of 22½°. The ends of the two arch pieces are connected by a special keystone unit which transmits the arch thrust whilst permitting a certain amount of movement to allow for strains and stresses. The outer walls are carried on beam footings between the columns, and the weight of the columns, walls and superstructure acts with the thrust from the roof frame. The foundations are consequently considerably shorter than with some conventional types of building and project further outside the walls than under the floor. The walls of no-fines concrete were poured between metal shuttering clamped between the columns on the site. This type of precast building is simple to erect, most of the work on this particular building being performed by a gang of 10 men working with two cranes, and at no time were more than 60 men engaged on the whole site. By virtue of the fact that the principal concrete members were made at Shipston, the work was able to continue throughout the severe winter.

Situated in the length of an outside loading bay which, eventually, is to have an overhead gantry crane, are the coke storage bunkers which were designed to fit in with the general framework of the building. They are placed in two sets of three and are each 50 ft. long, 37 ft. high and 15 wide, lined with glazed tiles. Apart from the main cantilever bracket, they had to be cast *in situ*, and were constructed in six weeks.

Two important features should make this type of building of interest in gasworks. First, is the safety element, for the entire building is constructed only of non-inflammable materials—glass, concrete and aluminium (sheeting for the roof cladding), and second, is the low cost of maintenance due to the fact that there are no parts which need painting nor any metalwork to corrode.

Top: One of the main bays of the foundry under construction.

Left: The six coke bunkers face a loading bay.

Below: An impression of the spaciousness of the foundry can be gained here.

The stars of today . . .

Brigitte Bardot, delightful French star, makes her British screen début opposite Dirk Bogarde in the new VistaVision-Technicolor comedy "Doctor At Sea". Adapted from the best-selling novel by Richard Gordon, "Doctor At Sea" is a J. Arthur Rank Organisation release, produced by Betty Box and directed by Ralph Thomas.

. . . are created by public acclaim. Cinema audiences acclaim charming Brigitte Bardot, who stars in the currently released film "Doctor at Sea"—and housewives acclaim the Century Cooker, which features in thousands of modern kitchens throughout the British Isles.

The roles of these two stars in contemporary life are in widely differing fields, but the pre-eminence of both is the result of their fulfilling the exacting demands of their respective roles.

Star features of the CENTURY

- ★ Vitreous enamelled surfaces throughout
- ★ Cream exterior
- ★ Removable double platerack
- ★ Used oven heat vented in front of backplate to heat platerack
- ★ Four fast-boiling hotplate burners with fixed stop for simmering
- ★ Large quick-heating grill
- ★ Safety-type taps
- ★ Hotplate parts removable
- ★ Roomy oven—base suitable for slow cooking
- ★ Mainstat controls oven temperature
- ★ Drop-type oven door
- ★ Oven lights from front by flash tube
- ★ Storage space in plinth
- ★ Hotplate side extensions and gas lighter supplied if required

R. & A. MAIN LIMITED
LONDON and
FALKIRK

The MAIN No. 20 CENTURY COOKER

Note the name-made by MAIN

C 59

instant hot water . . .

from the MAIN

NEW JUNIOR bath water heater

A.V...

with automatic valve

This heater has an output of 2½ gallons per minute raised 40°F. It is finished in white vitreous enamel with chromium-plated base and fittings. The Automatic Valve ensures that the gas is automatically cut off to the burner if the flow of water fails.

or I.C.

with interlocking gas and water cocks

The interlocking cocks prevent the gas being lighted before the water is turned on; it is equally impossible to turn off the water until the gas has been extinguished at the main burner. Output and finish as for the A.V. model (above).

There is a Main water heater for every domestic purpose

MAIN WATER HEATERS LTD

Gothic Works, Thornton Rd., Croydon, Surrey

W 33

The International Gas Union Meeting

THE Sixth Conference of the International Gas Union opened on September 27 in the Hotel New Yorker, New York. There were some 200 delegates to the conference, of whom 58 of the more fortunate had been able to bring their wives with them. Thirteen of the 17 Member Associations were represented; the 80 delegates of U.S.A. being followed by 40 from Great Britain and 35 from France. Italy, who provides the new President, sent 12 representatives. On the platform for the opening General Session were the retiring President, R. W. Hendee, of Colorado Springs; Mario Boselli, President-Elect, of Milan; M. Brabant, Hon. President, of Brussels; F. M. Banks, President of the American Gas Association; R. H. Touwaide, General Secretary of the Union; and Ambassador James J. Wadsworth, Deputy U.S.A. Representative to the United Nations, who officially welcomed the delegates.

The AMBASSADOR, in welcoming the delegates to the Conference, remarked that because of the location of 'United Nations' New York might now be considered as nearest to the centre of the world. The International Gas Union in many respects was similar to U.N., for it represented a genuine effort to get a joint 'know-how.' He went on to refer to the immense sums of money being found by his and other governments for the furtherance of people's welfare, but remarked that government help cannot be a substitute for private enterprise.

Value of Personal Contacts

M. TOUWAIDE, General Secretary, replied. He said that for most of the delegates the trip would really be the discovery of a new world. Thanks to these Conferences and the consequent exchange of views, progress and new developments were discussed every three years; but further than that, the human and personal contacts which were made gave them the opportunity to make friends all over the world.

The time had gone by when shortages in the means of production made it necessary in Europe to place restrictions on the sale of gas. Now they were once more able to produce gas in sufficient quantity to meet all the requirements of the consumers; and promotion and publicity were again trying to find new fields and new consumers. The gas industry's aim must be a policy of low-priced gas to enlarge the possibilities for all domestic consumers as well as to enable the industry to meet successfully the competition of all other fuels.

The international policy of the European gas industry had made great progress since the last International Conference. Frequent contacts between the leaders of the industry have enabled them to frame a common policy on some of the major problems and to study the economic problems in Western Europe.

The European Organizations

Close contacts with governmental organizations such as the Economic Commission for Europe, the Organization for European Economic Co-operation and the European Community of Coal and Steel had brought about a better understanding between the leaders of those organizations and those of their own industry. Due to the fact that the I.G.U. had been placed on the Register and was thus granted consultative status by the Economic and Social Council of the United Nations, gas experts had been officially invited by the Coal Committee of the Economic Commission to give their advice on the memorandum which the Secretariat of the Economic Commission were preparing on the evolution of the gas industry and its influence on the policy of the coal industry.

'All this, Gentlemen, shows you that the close co-operation between the International Gas Union, the Committee for Economic Studies and the governmental organizations will lead in the future to the further progress of our industry.'

The Future?

Dramatic changes might occur in the next three years if some of the really wonderful projects concerning the transmission of natural gas from the Near-East to Europe or even the transportation of liquefied methane became something practicable.

The hope was that a better understanding between the nations would permit a further study of those projects. Either would help Western Europe to benefit from the natural gas which is now very unfortunately wasted in the fields of the Near-East.

INTERNATIONAL TEAMWORK

F. M. BANKS, President of the American Gas Association and President, Southern California Gas Company, then gave a short address. He was, he said, grateful for the opportunity to speak to gas industry representatives from many parts of the world and thus play a small part in the international development of the gas industry.

The atomic energy conferences at Geneva had demonstrated that the nations of the world could overcome the triple barriers of language, ideology and geography, and work towards greater international understanding and advancement. Geneva proved that the day had passed when nations or peoples could go-it-alone in secrecy. The gas industry, especially where operated under government regulation, had no reason for secrecy and no desire to go-it-alone. Fortunately there was no limit to the topics at this conference. The sole purpose was the peaceful development of the gas industry—one of the world's largest and most important economic units. By learning how to provide its customers with greater comfort, convenience and safety, it had the power to advance materially the standard of living in all countries.

Gas Industry in U.S.A.

Mr. Banks went on to describe the set-up of the industry in the U.S. There were 1,400 individual companies serving more than 28 million customers. Thousands of other companies of all sizes produced and transported bottled gases to customers beyond the reach of utility mains. The average local distributing utility served 20,000 customers.

The increasing demand for gas had made the industry an important element in the economy of the United States. For example, at the start of the century gas accounted for almost 4% of the total energy needs of the nation, coal 90%, oil 4%, and water power 2%. However, at the beginning of 1955 natural gas was supplying about 25%, coal 30%, oil 41%, and water power 4%.

Their industry was joined by a network of more than 465,000 miles of pipeline that served gas to almost every part of the nation. Since 1943, more than 60,000 miles of long-distance, large diameter pipelines had been laid to connect the nation's gas users with the gas fields in the south-western part of the country.

Seven Servants of the Home

In the past few years, three new home applications of gas had been introduced to the American family. These additions —all-year gas air conditioning, gas laundry drying and gas incineration— had become important members of the gas appliance family. These, with gas cooking, water heating, space heating and refrigeration, comprised the seven servants the industry offered the home. Today, three-quarters of all Americans depended on gas service in their homes.

At the same time, stores, restaurants, laundries and hospitals, and other commercial customers accounted for 9% of the total gas consumption last year. One interesting thing about the commercial load was that 95% of the 65 mill. meals served daily in public dining rooms were cooked by gas.

Regulation of Utilities

With few exceptions, gas pipeline companies and utilities were regulated by municipal, state, or federal governments, and in some cases by more than one agency. A local gas utility was regulated by state and/or local commissions, which in most states approved rates, expansion or elimination of facilities, financing and accounting practices, allocation of deliveries to customers and other operations of the utility. Although a utility could not withdraw from a community at will, the public in many locations might revoke its franchise by vote and substitute a municipally-operated plant. This,

n effect, was a form of competition that timulated the private utility.

Almost all of the gas industry's growth had been financed by the public through the purchase of debt and equity securities. Hundreds of thousands of individual investors now owned stocks of utility and pipeline companies. Banks, insurance companies and investment trusts had purchased bonds with the money the public had entrusted to them.

The PAR Plan

For years, there had been an increasing conviction among gas men in the States that a nation-wide programme of advertising, promotion, development and research could be financed by voluntary subscriptions throughout the nation. A little over ten years ago member companies of the American Gas Association did agree to pool their resources and finances to launch A.G.A.'s 'PAR Plan'. The letters P-A-R stood for Promotion, Advertising and Research. This programme actually amounted to a partnership of American Gas Companies in a single project designed to meet growing energy needs and increasing competition. They had found the PAR plan to be a practical way to make the maximum use of the industry's combined resources through closer co-operation on a national scale.

PAR Promotion concentrated the industry's sales power for more selling efforts. PAR Advertising carried the story of better products to the customers and prospects, and PAR Research paved the way for efficient operations and better products. PAR Public Information helped companies develop a more favourable climate for the sale of gas and gas appliances.

The promotion programme gave a nation-wide impact by synchronizing national and local efforts through a series of organized sales campaigns for every major domestic and commercial gas appliance. Looking toward the future market—tomorrow's homemakers—thousands of schools were reached with educational material. Gas appliances were constantly displayed in television and movie films and publicity photographs to remind the viewing public of their presence. Few local gas companies would consider advertising campaigns in national publications to combat competitive activities. But the PAR Plan mobilized the resources of the gas industry to tell the gas service story on a national level.

The Laboratories

No picture of the U.S. gas industry at work would be complete without mention of the A.G.A. Laboratories. They were an unusual example of voluntary co-operation. Since 1925, the gas industry had subjected all gas appliances intended for public use to rigid tests to ensure their safety, durability and efficiency. More than 6,000 models of gas appliances were tested each year and more than 90% of gas appliances sold bore the A.G.A. Laboratories Seal of Approval.

As in any voluntary association, A.G.A. was dependent upon the efforts of its members and their free exchange of ideas and information. Their volunteer time and effort were the life blood of the Association's ability to get things done. To co-ordinate the work of the Association's leaders they had staffs at the two laboratories and another at the A.G.A. Headquarters in New York City.

PRESIDENT'S REPORT

The president then briefly reported on the work of the Union during the past three years. He himself had attended two Council meetings—one in Vienna and one in Stockholm—and these, together with others in Paris and Dusseldorf, evidenced the same splendid attendance and scope of work. One of the joys of the office was to realize that people of many nations and languages could meet together in an amazing spirit of friendship to exchange ideas and information freely and without reserve.

Mr. Hendee then referred to the work of the Gas Utilization Committee, which largely concerned itself with education in homes and schools. Progress had been made in co-ordinating essential clauses in the specifications for gas appliances. A complete report from the Committee was on the agenda of the Conference.

Suggestions had been made from time to time for the exchange of gas engineers between one country and another for periods of three, six, or even twelve months' duration. Mr. Hendee considered such a programme excellent; it had already been initiated between some of the member organizations.

Finally, Mr. Hendee thanked all the American gas companies and contractors who had contributed so much towards making the Conference a success, and the Host Association and its President (who had come all the way across the country from Southern California) for wonderful help and co-operation. And there was Monsieur Touwaide, who for three years had been his splendid help and guide in the affairs of the Union.

Dr. MARIO BOSELLI, Director General of the Gas Section of the Edison Company, of Milan, then took the Presidential Chair. He thanked the Members for their confidence and hoped that all would be able to attend the 7th Conference in Rome in 1958.

The General Session was concluded with an excellent film 'Natural Gas on the Move'; the Belgian report on Gas Industry Statistics; and a high-pressure sales address which we shall hope to abstract in an early issue of 'GAS SERVICE'. This was by E. Carl Sorby, of the Geo. D. Roper Corporation, of Rochford.

NEWS IN BRIEF

Stewarts and Lloyds, Ltd., the largest manufacturers of steel tubes in Europe, are exhibiting—with associated and subsidiary companies—a selected range of their products on Stand C.92 at the British Trade Fair being held in Copenhagen until October 16. On display are samples of screwed and socketed steel tubes and fittings, for the conveyance of gas, water and steam, and electric resistance weld tubes. Other products exhibited include models and examples of tubular steel lighting columns manufactured by the Company, mild steel tubes and tubulars and wrought fittings.

The Chief Constable of Reading (Mr. Jesse Lawrence) distributed safe driving competition awards to Southern Gas Board employees in the Northern Group of the Central Division. Both he and the Divisional General Manager, Mr. F. G. Symon, congratulated the winners of awards. These were: K. M. Gornall (third year oakleaf bar to his ten year medal); W. C. Appleton, F. T. Argent, H. T. Chandler, C. J. Curtis, N. J. W. Fox, J. L. King, W. E. Lewis and F. G. Smith (five year medals); T. J. Burkett, H. C. Clarke, A. Coles, P. E. J. Curtis, W. J. Field, L. Honey, R. Maskell, T. J. Mason, E. A. Meads, F. Milsom, L. E. Mitchell, C. S. Neate, V. A. Oxlade, G. H. Piper, F. E. Shepherd, E. E. G. Wakefield, and R. V. Whatley (yearly diplomas).

The Joint Committee of the National Coal Board and the National Union of Mineworkers met in London last Friday to consider further the basic procedure for conducting their output investigation. The next meeting will be in Cardiff this week.

Additions in hand at Blyth (Northumberland) gasworks which began some months ago are expected to be completed in twelve months' time. The extensions, costing £250,000, include the erection of an experimental type of purifying plant which, if successful, will be used in other parts of the country. The Newbiggin and Morpeth areas, which at present have their own gasworks, will be included in the areas to be supplied from Blyth when the extensions are completed.

Reporting to Coleraine Borough Council Gas Committee the Gas Manager, Mr. W. R. Armstrong, stated that the amount of gas manufactured from July 27 until August 31 was 17,554,400 cu.ft., an increase of 1,843,600 cu.ft. as compared with the corresponding period last year. The Committee adopted a resolution passed by Whitehead Urban Council calling upon the Minister of Fuel and Power to fix a uniform price for coal which would include free delivery to all parts of Great Britain and Northern Ireland.

A gas showroom is included in the plan for the proposed township centre at Drumchapel, Glasgow, which has been approved by the Housing Committee of Glasgow Corporation.

Scottish Association Meeting at Inverness

MR. JOHN FORD, Inverness, President of the Scottish Association of Gas Managers, welcomed a large number of members when the 94th annual general meeting was held in Inverness Town Hall on September 22. 'This pleasure,' he said, 'is enhanced by the meeting taking place in the capital of the Highlands, where I have spent the greater part of my life, in the service of the gas industry. When, a year ago, you elected me to the chair of our Association, I felt and still feel that the honour was one which I shared with the town of Inverness.'

The President acknowledged the co-operation and assistance he had received from the civic authorities in making arrangements for the meeting and called on Provost R. Wotherspoon to address the gathering.

PROVOST WOTHERSPOON, extending a civic welcome, said he had no doubt but that in the course of 94 years many larger towns had been visited, some with better facilities and all anxious to make the delegates feel at home. The Association had met at Inverness 21 years before and he hoped it would not be 21 years before they returned.

The President thanked Provost Wotherspoon for his remarks and stated that Sir Andrew Clow, Chairman of the Scottish Gas Board, with four members of the Board, had shown their interest in the Association by being present.

Personal Contacts

SIR ANDREW CLOW said it was a real pleasure for himself and his colleagues to have such an opportunity of making personal contacts. There was always a grave danger of a large organization becoming impersonal. The more one sat in an office the greater was the temptation to think of work in terms of things to be done instead of the people who did the things and those affected by them. He was not satisfied that the immense number of undertakings in Scotland and the wide area covered by the Board was any excuse for it being impersonal. All life was a matter of personality and the man who forgot that was lost. He was sure they had all given thought to the subject and they were trying to fight against being impersonal by means of personal contacts in preference to mere correspondence. For that reason his colleagues and himself welcomed the opportunity of making contacts inside that hall and outside.

The PRESIDENT said that Mr. W. K. Hutchison, President of the Institution of Gas Engineers, would have been present had he not gone to the United States to attend the International Gas Conference. But they had with them Dr. James Burns, the Vice-President, and Mr. W. K. Tate, the immediate Past President. Dr. Burns, Chief Engineer of the North Thames Gas Board, and therefore occupying one of the highest gas engineering posts in the country, was a Highlander, born and bred within a few miles of Inverness, where he had received an important part of his early education. His first introduction to gas had been in the laboratories of the Inverness Royal Academy.

DR. BURNS said the Association had been well guided during the past year in two respects, first by electing Mr. Ford as President and, secondly, by choosing Inverness as their meeting-place. His simple duty was, in Mr. Hutchison's absence, to convey the greetings of the Institution.

MR. W. K. TATE reminded the gathering that while he had been unable to attend the Scottish Association meeting during his year of office as Institution President, he had nevertheless paid two visits to Scotland during that year. Reference had been made to the number of Scotsmen on the Institution Council. He was an Englishman, proud of it as they were proud of being Scots, and happy to think how well he had got on with his Scottish colleagues on the Council. As they knew, he had recently left the production side of the industry and it would be impertinent on his part to speak to them on that subject. But they were all convinced that the future of the industry was bright. It had reached its present position through courage, resource and the ability to take calculated risks and these things were essential to-day. The success of the industry had been furthered by the close co-operation between those who made, supplied and sold gas and those who supplied the weapons for doing so. There had been great mutual trust on both sides and he hoped it would continue.

MR. E. W. PRIOR, of the Ministry of Fuel and Power, conveying good wishes from the Ministry, pointed out that the Ministry's interests were similar to those of the gas industry, namely, to extend their activities and meet public demand.

The PRESIDENT extended a special welcome to Mr. W. Sutcliffe, President of the North of England Section of the Institution, and to Mr. W. S. Hubbard, President of the Manchester and District Section, also to Messrs. James Campbell and David Fulton. 'At this juncture,' he said, 'I had hoped to call on Mr. Fulton to present the first of the medals which we have founded in his honour. Unfortunately, no student has this year passed the Final Part II examination with sufficient merit to justify the award. You will have noted from the annual report that Mr. Fulton has retired from the Secretaryship of the District Education Committee, a duty he has undertaken for well nigh 35 years. As was said of Sir Christopher Wren, it can truly be said of Mr. Fulton, particularly at this meeting "If you seek his monument, look about you." But while Wren built with stone and lime Mr. Fulton built with human beings. For the assistance he has given to so many, in fostering their careers in the gas industry, we cannot sufficiently express our gratitude.'

The SECRETARY, MR. W. KIRK, Greenock, intimated apologies, including telegrams from Mr. D. D. Burns, Vice-Chairman of the Scottish Gas Board, and Mr. Clifford King, Managing Director, 'GAS JOURNAL,' conveying good wishes for the success of the meeting and thereafter members stood in memory of the late Mr. E. J. Boston, of the Scottish Tar Distillers, who died on April 7 and who had been an Extraordinary Member since 1938.

Following the approval of the annual report and statement of accounts it was agreed, in view of the satisfactory financial position of the Association, to reduce the annual subscription by five shillings. Messrs. L. Bain, Cullen; C. W. Dalton, Arbroath; D. V. Reid, Gourock; and J. Young, Darvel, were elected to life membership and the following applications were passed: Ordinary Members — Messrs. A. R. Barrack, Fraserburgh; A. C. Hastings, Muirkirk; F. B. Keillor, Berwick-on-Tweed; W. Marshall, Troon; Extraordinary Members—Messrs. J. D. Brown, of Gillon, Brown and Co., Ltd., Glasgow; N. V. Cross, of Woodall-Duckham Co., Ltd., Edinburgh; W. Douglas, Douglas Firebrick Co., Ltd., Dalry; W. C. Hogg, Coal Utilization Council; P. E. Holt, Newton Chambers and Co., Ltd., Thorncliffe; R. Murray, Lewis Berger (Scotland), Ltd., Glasgow; and D. Scott, Thomas Glover and Co., Ltd., London.

DR. BURNS then spoke to his Paper, 'New Loads and New Costs,' an abstract of which, together with discussion, is published on p. 43.

After the lunch adjournment MR. T. SMITH read his paper. An abstract of this and the discussion will be published in a forthcoming issue of our sister journal 'Gas Service.' It was intimated that Mr. W. C. Campbell would succeed Mr. Ford as President, with Mr. W. M. Gledhill, Stirling, as Senior Vice-President and Mr. George Hannah, New Cumnock, as Junior Vice-President. Mr. David Beavis, Edinburgh, and Mr. C. B. S. Mitchell, Kilmarnock, were elected to the Council.

The PRESIDENT, installing his successor in the chair, recalled that 21 years ago, at Inverness, Mr. W. C. Campbell had received a Higher Grade certificate of the Institution of Gas Engineers, which he had gained 'with distinction.' He would bring distinction also to the chair of the Association.

MR. CAMPBELL replied suitably and MR. ATHOL W. BROWN. Immediate Past President, presented Mr. Ford with a souvenir of his year of office. MR. L. BAIN, Cullen, who was Association President when, 21 years ago, the annual meeting was held in Inverness, proposed an omnibus vote of thanks, MR. W. KIRK replying. It was announced that the Spring Meeting would be held in Paisley on April 27, 1956.

In the course of the proceedings, Mr. T. B. Noble, who for many years had reported the proceedings for the Trade Press, was presented with a travelling clock in recognition of his services.

GOLF

Scottish Association of Gas Managers

★

AUTUMN MEETING

THE Autumn Competition was played over the Nairn Golf Course on September 21, 1955. The results were as follows:—

		Score
Winner of Challenge Bowl and Captain's Prize	G. E. Jeffs	84 *less* 13 = 71
SECTION I		
First prize	T. Robertson	80 „ 6 = 74
Tie	W. P. Rae	84 „ 10 = 74
Second prize	T. H. Johnston	77 „ 2 = 75
Tie	D. Beavis	79 „ 4 = 75
	C. A. Chapman	81 „ 6 = 75
SECTION II		
First prize	D. D. Melvin	88 „ 14 = 74
Second prize	D. Mungall	94 „ 17 = 77
Third prize	H. S. Milne	97 „ 17 = 80
	J. Campbell	98 „ 18 = 80
Fourth prize	J. Adams	96 „ 16 = 80
	H. Q. Marris	98 „ 18 = 80
VISITORS		
First prize	C. H. Macleod	84 „ 8 = 76
Second prize	E. Spurrier	92 „ 16 = 76
Third prize	A. R. Barrack	96 „ 18 = 78

In the ladies' golf section, which played over the Culcabuck course, the prize winners were:

Handley Salver and 1st prize	Mrs. G. Keillor
Second prize	Mrs. H. Milne
Third prize	Mrs. D. D. Burns
Scratch prize	Mrs. D. Melvin
Hidden holes prize	Mrs. Praties

Mrs. D. D. Burns had a hole in 1 at the 15th.

Immediately following the golf and the presentation of prizes by Mrs. Duncan Melvin, wife of the Captain of the Circle, came the Annual General Meeting. Mr. W. Sutcliffe replied on behalf of the visitors to a welcome proposed by Mr. Melvin. He said that they had had a most pleasant day and had been made most welcome. Mr. Melvin thanked Brigadier Duncan, Captain of Nairn Golf Club and Mr. Mann, the Secretary, for the courtesy of the course and for the arrangements which were made and the hard work which went with it. Brigadier Duncan replied.

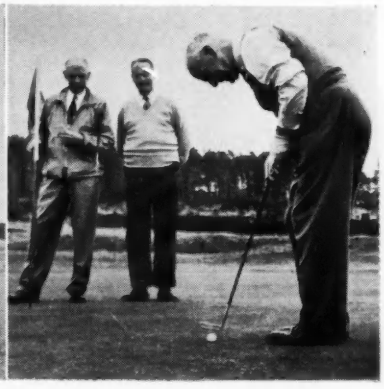
After the usual business on the agenda came the election of officers. Mr. J. D. Cooper was elected Captain, Mr. J. M. Dow Vice-Captain, and Mr. E. G. Smith to the Committee.

Mr. Cooper thanked members for the honour and proposed a vote of thanks to Mr. Melvin for his work in the past year. Mr. Melvin replied briefly and paid tribute to the Committee and particularly to Mr. W. P. Rae, Hon. Secretary and Treasurer, for his continued hard work.

The Golf Committee with the Challenge Bowl winner and Mrs. Duncan Melvin after the presentation ceremony.

J. Macpherson Carnoustie, W. Sutcliffe, and C. H. Angus add up the figures at the 18th green.

J. Dow shows T. Ross and W. J. Crawford how to sink putts.



The final putt on the 18th by the Captain is watched by S. Bennet and H. A. Aitken.

W. T. Wright, C. A. Macleod, and C. T. Baker-Carr wait for their turn to start.

R. Stewart, Athol Brown, and D. J. Colvin chat on one of the greens.

W. M. Gledhill, R. Sturrock, and L. Fletcher make the final tally on the 18th.

BOWLS

September Meeting of Scottish Association of Gas Managers Bowls Club

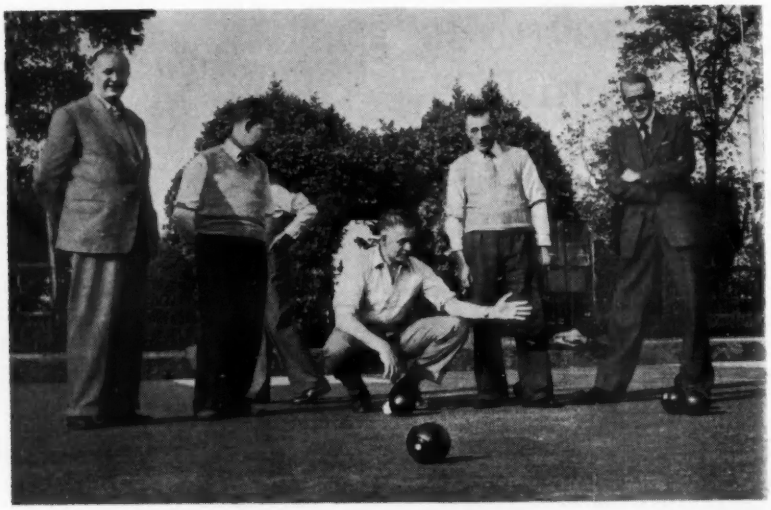
A LARGE number of members and visitors attended the September meeting of the Scottish Association of Gas Managers Bowling Club at Bishop's Road Bowling Green, Inverness, on September 21.

The Bowling Trophy was won by the following rink which was 17 shots up: J. G. Rutherforth, Dalkeith; J. D. Brown, Glasgow; J. McMillan, Auchinleck; C. Wilson, Carluke.

Second prizes were won by: J. McKellar, Glasgow; C. Varcoe, Farnworth; D. Philp, Denny; F. Bradley, Glasgow. 16 shots up.

Prizes were presented by Mrs. John Ford, wife of the President of the Scottish Association of Gas Managers.

At the Annual General Meeting held in the club-house afterwards Mr. J. Ford, Inverness, was elected President of the Club for 1955/56.



Top: *'Skip' Rutherforth directs one of his team in one of the rinks held at Inverness.*

Below top: *Mrs. Varcoe, Mrs. Philip King, and Mr. E. Butterworth chat while watching the bowling.*

Left: *A member shows complete optimism while (presumably) an opponent cannot bear to watch.*

This group of members makes an excellent study in concentration, while . . .

. . . A group of wives enjoy the sun while watching their husbands.

PARKINSON STOVE COMPANY'S LONG SERVICE ASSOCIATION

Members of the Parkinson Stove Company's Long Service Association during their recent visit to Woburn Abbey, Bedfordshire. Among those present were Mr. R. J. Rogers, Chairman, and Mr. J. L. Anstey, Sales Director. Luncheon and tea were taken in the delightful surroundings of the home of the Duke of Bedford. In all, 95 members of the Association were present who had served the Company from 21 to 55 years. The day proved to be a very enjoyable one.

Northern Gas Board Introduces 'Colour in the Home'

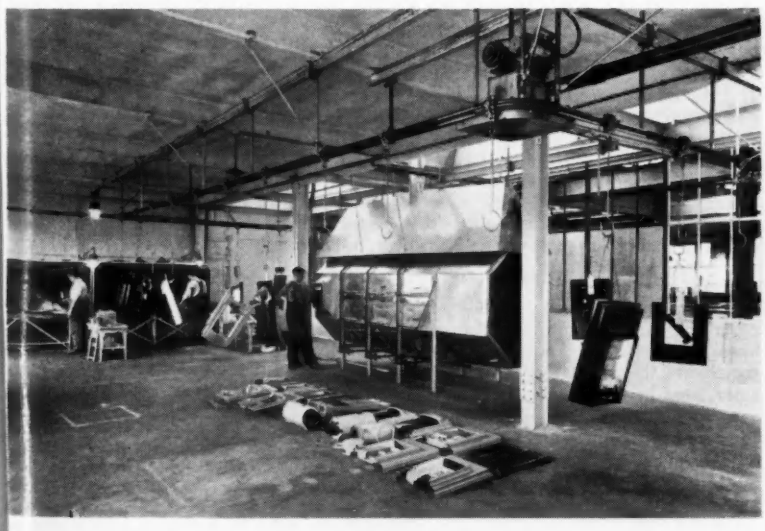
Some time ago, as a means of adding interest to their cookery demonstrations, the Northern Gas Board introduced talks upon the use of colour in the home and demonstrated how gas appliances could be made to effectively match up with whatever colour scheme had been selected for lounge, dining room, hall or kitchen. The talk illustrated that appliances, especially gas fires, could be colour sprayed to an exact match with the tiling of the fireplace or indeed could be matched with the soft furnishings of any room. A 'Colour in the Home' Service was therefore introduced and the facilities given have attracted very considerable attention from the consumers.

In the course of time the operators at the spray booths acquired a high degree of skill and indeed built up a variety of techniques of their own resulting in business developing to such a degree that it was necessary to entirely remodel and enlarge the existing plant. The colour finishing shop was therefore remodelled upon the lines illustrated in the accompanying photograph which shows the spray booths at which the appliances are coloured and the continuous radiant heat drying oven where the colour process is finished; the time saved by this method is such that upwards of 250 appliances are handled per five-day week.

To ensure that these highly decorative finishes reach the consumer undamaged a new form of packaging as illustrated here has been adopted. Not only does this ensure complete protection during delivery but a very substantial saving has resulted upon the former method of corrugated paper packing plus, of course, the greater time required by such a procedure over that now taken for the simple insertion of the appliance in its delivery envelope, in spite of its cost of 36s. each.

Special rush jobs are undertaken from time to time to meet the needs of consumers where perhaps it is necessary to comply with a decorator's programme, and it is not unusual to bring away an old fire, re-spray to the new colour and finish, construct and spray a suitable sheet metal hearth plate to match, return and instal the fire within 48 hours.

Left: General view of spraying shop. Right: New delivery envelope used by Northern Gas Board.



ROAD SAFETY AWARDS

Left to right: Mr. A. W. Mahoney, Transport Superintendent; Mr. F. J. Avery receiving safety award certificate; Mr. J. W. Dean, Divisional Engineer and Manager of South Western Gas Board; Mr. H. L. Trebilcock; at the Safety First Drivers awards of the South Western Gas Board. Mr. Dean is in centre of photo.

A 'Driver of the Year' competition to promote road safety was suggested at Plymouth by Mr. J. W. Dean, Divisional Engineer and Manager of the Plymouth and Cornwall Division of the South Western Gas Board, when he presided at a presentation of road safety awards to over 50 drivers at the Royal Assembly Hall by Mr. H. L. Trebilcock, Hon. Organizing Secretary of Plymouth Road Safety Committee.

Mr. Trebilcock said that accidents in the first months of 1955 stood at 774, as against 700 in the same period last year.

While praising the standard set by the drivers to whom he presented the awards, employees of the Plymouth section of the Plymouth and Cornwall Division of the South Western Gas Board, Mr. Trebilcock said there were many drivers who did not measure up to the same high standard.

The drivers present, who received their awards for both one and two years' accident-free driving, were making a positive contribution to road safety activities in Devon and Cornwall, Mr. Trebilcock added.

Mr. Dean said it was the second year in which the Plymouth and. Cornwall Division had entered into the safe-driving scheme.

The numbers entering were keeping up well and the drivers had maintained a high standard of courtesy on the road and maintenance of their vehicles. They wanted the transport fleet to build up a reputation for road safety.

In the year under review ended 1954, vehicles of the Board had travelled over 1,000,000 accident-free miles in the division.

The drivers present each received a Royal Society for the Prevention of Accidents certificate. Also present was Mr. A. W. Mahoney, Transport Superintendent for the Plymouth and Cornwall Division.

Those who received certificates were: F. J. Avery, C. A. Babb, L. E. Belbin, F. W. Blampey, E. W. Boyce, C. E. Buckley, F. Cooke, F. T. J. Coombes, W. P. Cox, W. Crocker, H. Cross, E. E. Donovan, W. H. Dore, T. H. N. Edge, W. J. Fishley, J. H. Fletcher, G. G. Friend, G. A. Gendle, R. A. Harris, R. J. Harris, W. H. Hawke, R. D. Hearn, G. Horsefall, N. J. Keane, S. King, C. N. Lang, R. G. Lawrence, J. Lawry, R. R. Lugg, D. J. May, A. S. Maynard, H. C. Mitchell, L. Mitchell, H. E. Mortimore, K. A. Moyse, W. Osborne, F. J. Parnell, A. Pearn, L. Pearn, J. Prouse, J. Richardson, R. W. Roberts, O. Sharp, L. W. Sheppard, E. R. Shewbrook, H. J. Smith, W. H. T. Smith, A. H. Stoneman, G. P. Trout, S. Turpin, R. T. Virgo, G. H. Ward, F. L. Warne, T. H. W. Watson, A. H. Weller, G. Williams and H. Williams.

B.S.I. Sales Office in Birmingham

Through the co-operation of the Birmingham Chamber of Commerce, the British Standards Institution has opened a sales office in the headquarters of the Chamber at 95, New Street, Birmingham 2. This development is in line with the B.S.I.'s policy of making British Standards readily available at important industrial centres. Experience in Manchester, where the B.S.I. has for long had a branch office (now at Coronation House, Market Street), has shown that such a facility meets a real local need. The new office in Birmingham will maintain a full and up to date stock of all British Standards and associated publications, which will help to meet more effectively the growing demand for British Standards from industry and commerce, and from students and technicians.

The New Street office will operate at all normal working hours. In addition to the sales counter, it will provide facilities for the inspection of British Standards by interested persons. Normal reference facilities will continue to be available at the Public Library in Birmingham, as in many libraries in other parts of the country.

Company News

NICO LIGHT ENGINEERING

The report and accounts of Nico Light Engineering Co., Ltd., to March 31, 1955, show a reduction in the bonus dividend of 5% compared with last year. The Directors have recommended a 10% dividend and a bonus of 5% making 15%. The bonus dividend reduction is explained by the Chairman as being due to an approximately 30% increase in the cost of brass and other materials. This also explained the increase in the value of the Company's stocks of new materials from £60,964 to £79,280 and this had resulted in a shortage of ready cash. The Chairman said the factory would be kept occupied for some time ahead, but as their productions included component parts for gas cookers and other appliances affected by the new hire-purchase conditions this might result in reduced sales later in the year. The accounts showed a trading profit of £41,406—an increase over the previous year of £2,531. The balance carried forward after the deduction of depreciation, building reserve and dividends was £10,870.

WILSON METERS

At a recent board meeting of George Wilson Gas Meters, Ltd., of Coventry, the directors decided to recommend payment of a dividend of 15%, less income tax, on the Ordinary shares of 4s. each. This is the same as last year. It will absorb a net amount of £6,237, compared with £5,966 last year. It is proposed to pay the dividend on November 1, together with the half-year's preference dividend due on that date. Group profits of the company and its subsidiaries for the year ended March 31, 1955, amounted to £39,936, before charging provision for taxation, £20,800, leaving a net profit after taxation of £19,136. From the net profit must be deducted £277, the proportion of net profit of one subsidiary attributable to outside shareholders. Last year the gross profit was £24,308; taxation £13,586; and the net profit £10,722.

The Coal Utilization Council will open a permanent exhibition centre at Atholl Place, Edinburgh, before Christmas. Glasgow already has one.

New Coking Plant

The new Lambton coking plant of the Durham Division of the N.C.B. was opened on Saturday afternoon by Mr. Austin Kirkup, former managing director of Lambton, Hetton and Joicey Collieries, Ltd. This is the second new coking plant to be officially opened since the Durham Divisional Coal Board announced its major carbonization development plan three years ago. New coke ovens at Fishburn came into operation last year.

The cost of the entire development plan, including the construction of coke ovens and the reconstruction or sinking of pits on which the new ovens will rely, is estimated at about £21 million. The new Lambton plant has been built at a cost of more than £2,500,000.

Capacity

There are 52 ovens in this plant capable of carbonizing 1,000 tons of washed coal a day compared with about 550 tons per day at the old plant which it has replaced. The coal is brought in over the Board's railway from the Lambton and Herrington pits and is tipped from wagons, elevated, into 20 concrete bunkers with a total capacity of 4,000 tons and then withdrawn from these bunkers by means of variable speed conveyors to ensure an even blend. After blending and crushing the coal is conveyed to the ovens service bunker which holds 2,000 tons. It is then loaded as required by car into the ovens.

After carbonization has taken place the coke is discharged into a coke car and automatically quenched under a central tower. The quenched coke is discharged on to a wharf and conveyed to a coke screening plant, where the oversize is loaded into wagons for blast furnace use and the undersize is graded for the domestic and industrial markets.

The plant will produce 7,500,000 cu.ft. of purified gas daily for sale to the Northern Gas Board. It will be used mainly in Sunderland and Houghton-le-Spring with any surplus for transfer to other areas through the gas board's grid system. Each year the plant will be capable of producing 250,000 tons of coke, more than 3,000,000 gallons of tar, a million gallons of benzole and 4,000 tons of sulphate of ammonia.

The plant has been built by the Coppee Company (G.B.), Ltd., on the site of several pitheaps which had to be cleared and levelled before construction could start. To ensure the plant's stability more than 2,000 concrete foundation piles were sunk on the site, which is one of the oldest coke manufacturing areas in the country, coke having been made there for more than 100 years.

The British Oxygen Co., Ltd. has negotiated the acquisition of building ground at Ravenscraig, Motherwell adjacent to the huge new steelworks which Colvilles, Ltd. are in the process of constructing. The company has been offered two sites in the area which are surplus to the needs of the steel plant. The Colvilles project is one of the largest in process of construction in Scotland.

North Thames 'Bride of the Year'

The North Thames Gas Board held their area final of the 'Bride of the Year' competition on September 20 at Chelsea Town Hall. Guests of honour were the Deputy Mayor of Chelsea, and Dame Vera Laughton Mathews, Advisor to the Gas Council on Women's Subjects, who originally conceived the 'Bride of the Year' idea. The competitors were given four separate tests. First, to prepare and serve a breakfast for two people; second, to make shortbread biscuits; third, to place correctly in the refrigerator various goods from a shopping basket and fourth to prepare a salad suitable as a main dish and which could be left in a refrigerator. Each of the eight competitors was provided with a separate kitchen with a different make of cooker in each. The first prize of £100 worth of appliances went to Mrs. B. M. Seligson, of Thundersley, Essex, who will now compete in the National Finals at the Festival Hall on November 1. Mrs. Seligson used a Stoves X2 cooker and an Electrolux L.230 refrigerator.

Mrs. A. Chantrell, of Muswell Hill, took second place and won £75 worth of appliances, and a similar second prize of £50 was won by Mrs. H. E. Saunders, of Kenton, Middlesex. The runners-up, Mrs. B. M. Brady, Mrs. S. B. Edwards, Mrs. R. C. MacDonald, Mrs. J. R. Macey and Mrs. M. Munro, were each awarded prizes of vouchers for gas equipment to the value of £25. Mrs. Michael Milne-Watson, wife of the Chairman of the North Thames Gas Board, presented the prizes. Displays and demonstrations of various types of equipment were also held throughout the evening.

A general view of five of the eight individual kitchens used by the competitors; the white-coated assistants who helped each 'bride' in her tasks, can be seen in this picture together with some of the large audience which attended.

Stringer Brothers Centenary

Stringer Brothers, of Albion, West Bromwich, celebrate their Centenary this month. Well known throughout the iron and steel industry, the Company still has in its possession the actual ledger and day-book recording the first transaction on October 2, 1855. Founded in Dudley by A. D. Stringer, J.P., of Beechwood Hall, and his brother, E. H. Stringer, J.P., of Edgbaston Hall, Birmingham, the firm moved to West Bromwich a few years later. Today, following his father and uncle, is Mr. C. A. Stringer, a grandson of one of the founders.

As the business prospered and expanded it formed close links with the gas industry in supplying iron and steel for maintenance and repair work. Ten years ago Mr. W. F. Caton, son of a former Managing Director and Chief Engineer of the Oxford and District Gas Company, was appointed to supervise gas interests, and is now also one of the proprietors.

During its 100 years of progress the firm has seen many changes. The price of iron is at least eight times what it was in the 1880's and has largely been ousted by steel. When the present Mr. Stringer's father talked of steel taking the place of iron it was regarded at that time as little more than a new-fangled idea. The firm supplied goods to Queen Victoria and had the Royal Cypher on its letter headings for many years.

Centred in the Black Country, where there is probably more concentrated industry than in any other part of the world, and industrial history is consistently being made, Stringer Brothers have made their own contribution to that history.

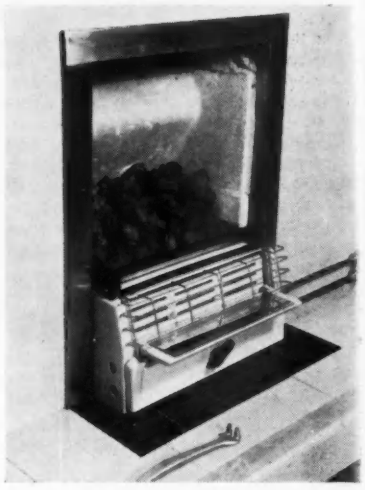
New World Gas and Coke Fire

We have received further details of the new combined gas and coke fire which was mentioned briefly in the article *Two Boards for Commercial Television* in our issue of September 14.

The well-tried Fulham inset fire forms the basis of the design and the gas fire is an application of the silent beam principle. The solid fuel portion of the appliance retains the features of the familiar Fulham inset fire. The proportions and general design are closely similar to those of the Fulham, with deep one-piece vitreous-enamelled front casting and rectangular ashpit cover with control lever in the middle. Rate of burning is adjusted by the lever on the ashpit cover, and the effective control is ensured by machined faces on the fire front and ashpit cover. Means for fixing the fire firmly into the hearth, and for sealing between fire front, side bricks and hearth, also contribute to accurate control of burning. A gas burner is fitted for trouble-free kindling of the solid fuel fire, and a flash-ignition arrangement makes it easy to light the burner from the front of the fire. A one-piece front fire brick is fitted. The bottomgrate rests on the firefront and on separate legs at the back. The castings are notched to make it easy to fit the fire correctly in spite of variation in the dimensions of the fireback and in the position of the boiler fluemouth if present. A deepening bar, an operating tool and an ash pan are provided.

A novel feature is a small reflector at the top of the firefront, also serving to prevent ash falling forward into the gas fire. The latter is accommodated in the upper part of the firefront, normally concealed by a fall-down door. The burner has twelve neat gas jets of the Bray miniature series, and the combustion chamber above the burner is formed by a flat refractory brick assembly at the back and small Rado-panels at the front. The three Rado-panels are placed side by side and are like those of the silent beam fire but smaller in height.

A reflector fitted to the inside of the gas fire door enhances the working appearance of the fire by reflecting the glow of the heated Rado-panels. A fireguard covers the front of the gas fire and its lower part interlocks with the gas fire fall-door. When opening or closing the fall-door the guard hinges upwards out of the way and afterwards falls to the normal vertical position.



The gas fire fall-door is shown in open position.

The nominal rate of the gas fire is 12,000 to 12,500 B.Th.U. per hr., and a throttle screw is provided so that the fire can be set correctly at installation. —*Radiation Group Sales, Ltd., Gas Division, Stratford Place, London, W.1.*

A NEW SHOWROOM FOR UXBRIDGE

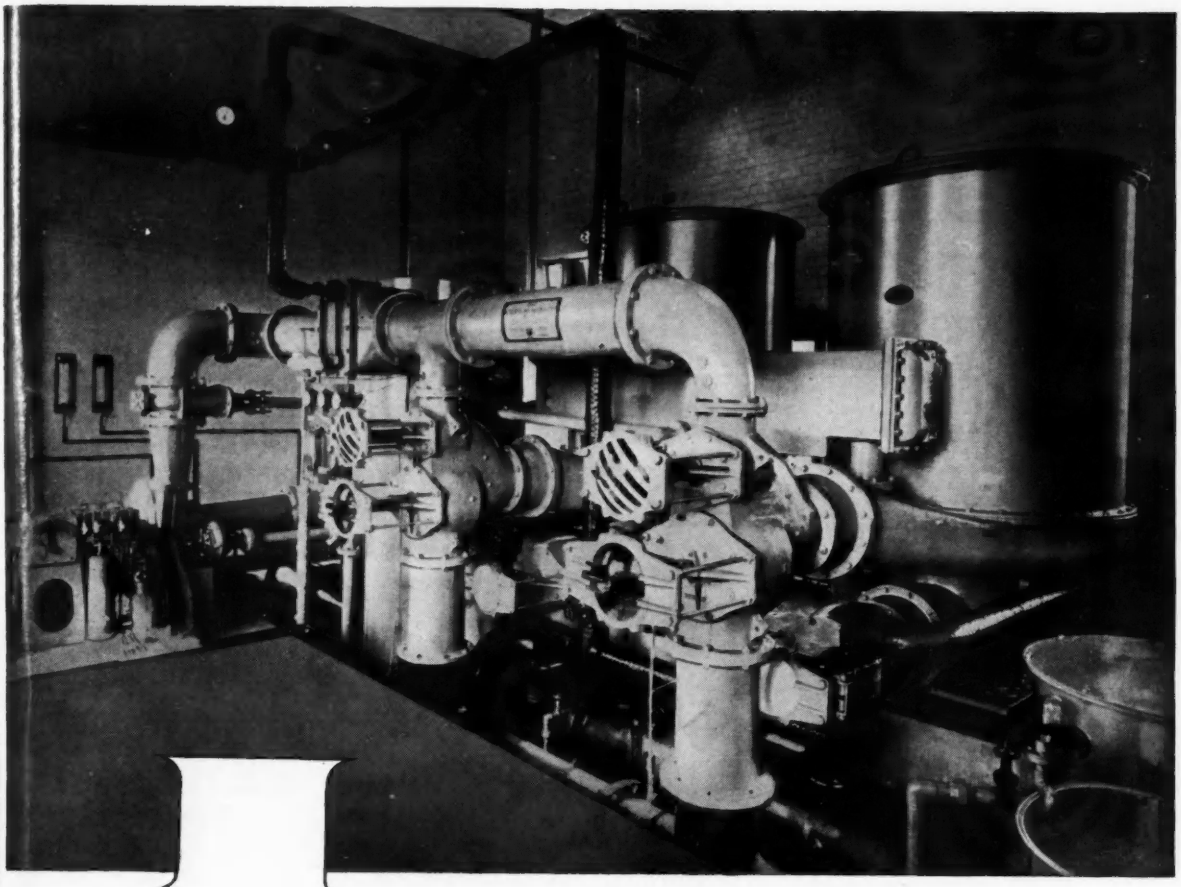
The completion of the North Thames Gas Board's new showroom in High Street, Uxbridge, must be accepted by the inhabitants of that over-grown market town with both pleasure and relief—pleasure because the new showroom is everything a modern showroom should be, and relief because the gaunt skeleton of girdering which has stood stark and angular for so many years has at last been clothed. The project was started before the war, and for various reasons the building could not be completed. The development of the territory that the building is to serve has now been so enlarged that the premises, in addition to containing the showroom for the service of Uxbridge and district consumers, now houses the headquarters of the Board's South Western Division.

Right: The Mayor of Uxbridge, accompanied by the Mayoress, Mrs. Barclay (Board Member) and Mr. F. M. Birks, Deputy Chairman, North Thames Gas Board.

Below: Part of the showroom showing the water heater display and model 'kitchen.'

The showroom had a full-dress opening on September 28, with the Mayor of Uxbridge, Alderman Pomeroy, ceremoniously opening the doors for the first time, and with the Deputy Chairman of the Board, Mr. F. M. Birks, C.B.E., and other senior officers of the Board in attendance.

The interior design of the showroom is something of a triumph for the Board's Architect, Mr. Haynes, who has combined clean design with a pleasing warmth of colour. A feature of the showroom is a demonstration kitchen where demonstrations will take place before small invited audiences; this is a departure from previous practice, which involved the hiring of separate premises. There is a service counter where spare parts may be purchased, and also a coke order booth for customers' convenience.



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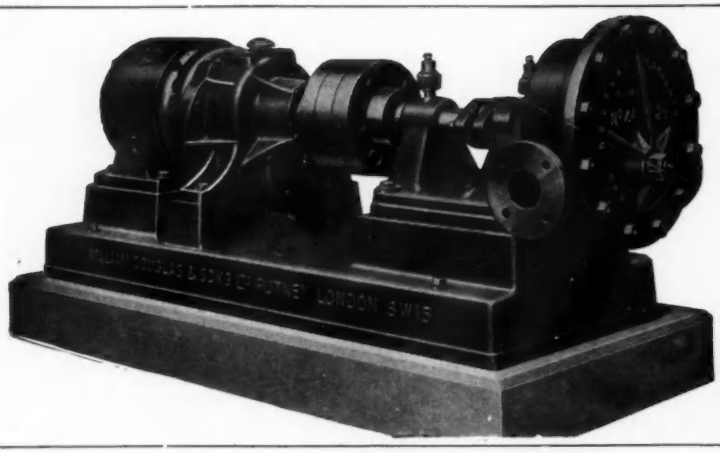

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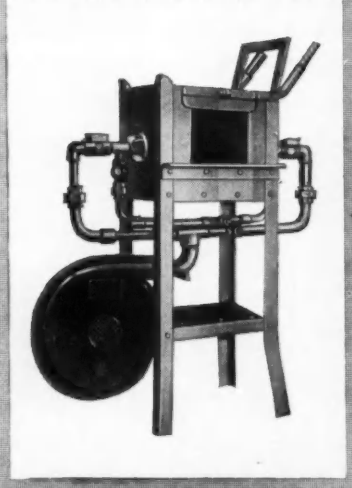

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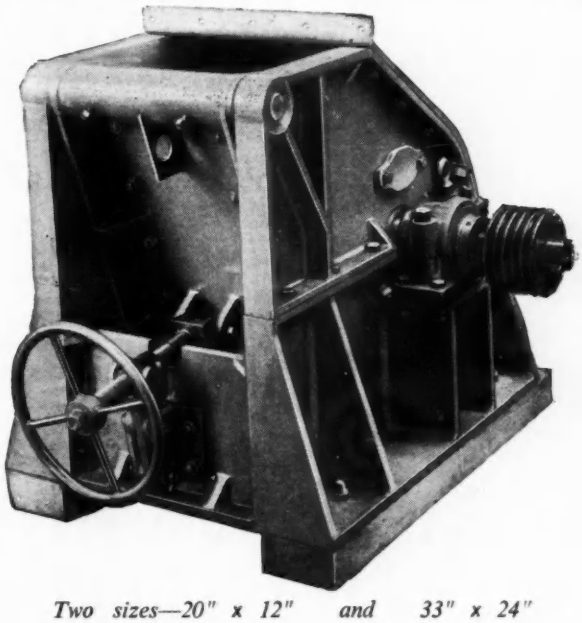

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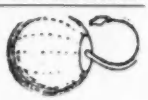
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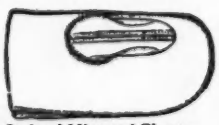
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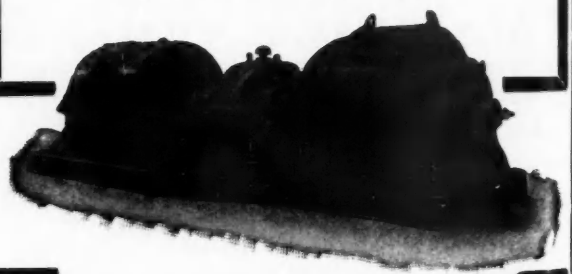
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Classified Advertisements: All small classified advertisements are charged at 2/- per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is exempted from the provisions of the Notification of Vacancies Order, 1952.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
VACANCY FOR FIRST CLASS GASFITTER—WELLINGBOROUGH GROUP

THERE is a vacancy for a FIRST CLASS GAS-FITTER in the Wellingborough Group. J.I.C. conditions and rates of pay (Provincial A rating).

The successful applicant may be required to work anywhere within the Group and accommodation is available under a standard Service Occupation Agreement. The accommodation consists of a flat situated on the Holder Station at Raunds.

Applications are invited and these, stating age, experience and qualifications and giving the name of a referee, should be sent to the Group Manager, Commercial Place, Wellingborough, to be received not later than Wednesday, October 12, 1955.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester.
September 22, 1955.

EAST MIDLANDS GAS BOARD

NOTTS & DERBY DIVISION
HOME SERVICE ADVISERS—BURTON-UPON-TRENT DISTRICT.
HEANOR DISTRICT.

APPLICATIONS are invited for the position of Home Service Advisers in the above Districts at a salary rising to £494 per annum according to qualifications and experience.

Candidates must be capable of working independently and be in possession of a recognised Diploma in Cookery and/or Domestic Science. They should be proficient in the practical demonstration of gas cooking, laundering and other appliances involving the use of gas in the home.

The positions are pensionable, and the successful applicants will be required to pass a medical examination.

Applications stating age, experience and present position, and giving full particulars of training and qualifications, together with the names of two referees, should reach the undersigned not later than Friday, October 14, 1955.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts. and Derby Division,
Friar Gate,
Derby.

EAST MIDLANDS GAS BOARD

NOTTS. & DERBY DIVISION
SENIOR DISTRICT REPRESENTATIVE
BURTON-UPON-TRENT DISTRICT

APPLICATIONS are invited for the position of SENIOR DISTRICT REPRESENTATIVE in the Burton-upon-Trent District.

The successful applicant will be required to co-ordinate the work of the District Representatives, the District Gas Fitting Foremen and the District Clerks in order to promote the maximum sales of gas coke and suitable appliances and to maintain a high standard of service to the consumer.

The commencing salary will be within the range of A.P.T. 6 (£565/£645) according to qualifications and experience.

The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, experience, qualifications and training, together with the names of two referees, should be submitted to the undersigned not later than Friday, October 14, 1955.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts. and Derby Division,
P.O. Box No. 62,
Friar Gate,
Derby.

NORTH THAMES GAS BOARD

CHEMISTS and PHYSICISTS holding University degrees are required in the Laboratories at Watson House, Fulham, S.W.6, to undertake research work on the utilization and design of domestic and industrial gas and coke appliances, particularly on cookers, water heaters, gas and coke fires, refrigerators, and industrial apparatus.

The Laboratories have recently been modernized and extended, and are responsible for research work for the Gas Industry throughout the country.

The appointments will be permanent and pensionable, and the starting salary will be within the range of £635 to £850 per annum, according to age, qualifications and experience.

Applications should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, W.8, quoting reference No. 666/280, to reach him within ten days of the appearance of this advertisement.

NORTH WESTERN GAS BOARD

WIRRAL GROUP
TECHNICAL ASSISTANTS (PRODUCTION)

APPLICATIONS are invited for the above pensionable appointments at salaries within Grade A.P.T. 7 (£620/£700 per annum).

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B. (Wirral Group), Hind Street, Birkenhead, within 14 days.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited for the following pensionable appointments:—

MANCHESTER GROUP.

WORKS SUPERINTENDENT—Partington Works (Salary within Grade A.P.T.10—£760/£860 per annum.)

Applicants should be qualified by training and experience in the control, operation and maintenance of vertical and horizontal carbonising plants, C.W.G. and other ancillary plant, and have had a wide experience in the control of labour on a large gas works.

DRAUGHTSMAN — DISTRIBUTION DEPARTMENT.

(Salary within Grades A.P.T. 7/8—£620/£740 per annum.)

Applicants should have a knowledge of the design and layout of distributing plant, including boosting and governor systems and the maintenance of plant records. They should possess the Higher National Certificate of the Institution of Mechanical Engineers, or hold an equivalent qualification.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B. (Manchester Group), Town Hall, Manchester, 2, within 14 days.

EAST LANCASHIRE GROUP.

ENGINEERING DRAUGHTSMAN.

(Salary within Grades A.P.T. 7/8—£620/£740 per annum.)

Candidates should be experienced in the design and construction of steel work, have had sound drawing office training, experience of site surveying and the preparation of plans. Possession of Higher National Certificate in Mechanical Engineering will be an advantage.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B. (East Lancashire Group), Cardwell Place, Blackburn, within 14 days.

PATENTS

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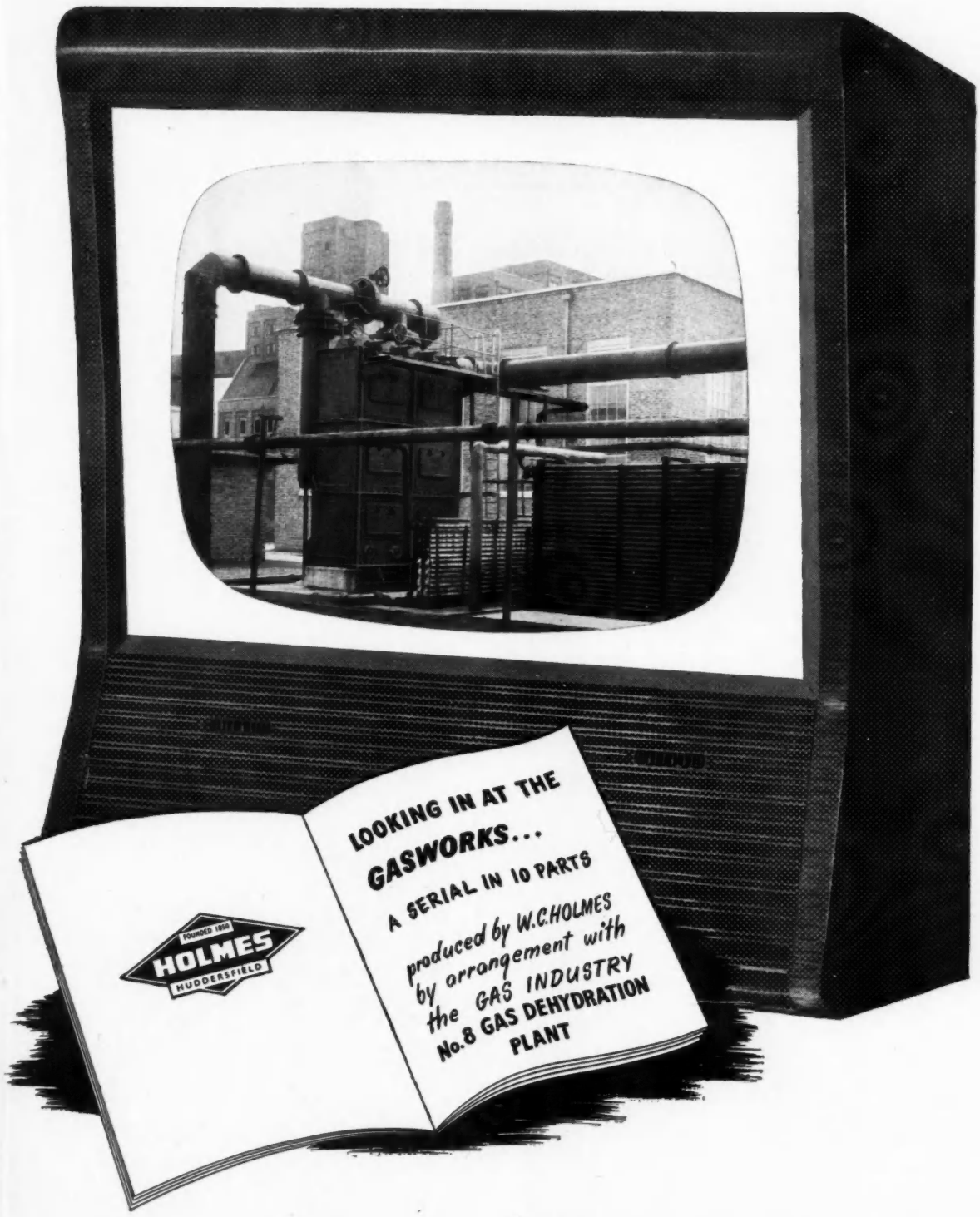

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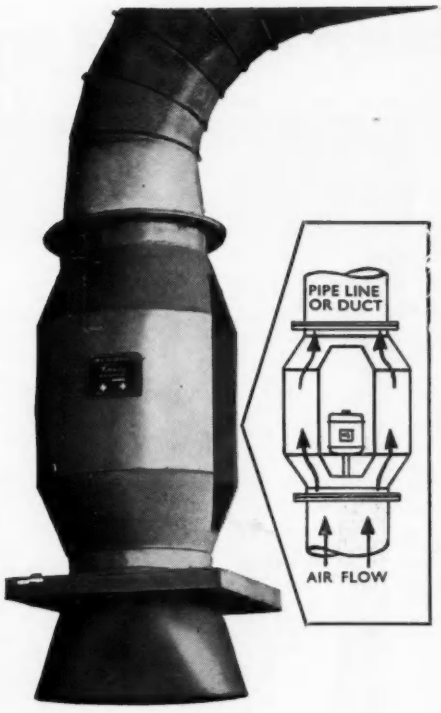

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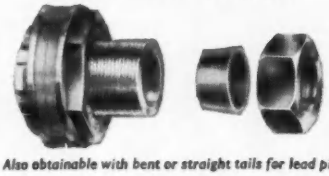

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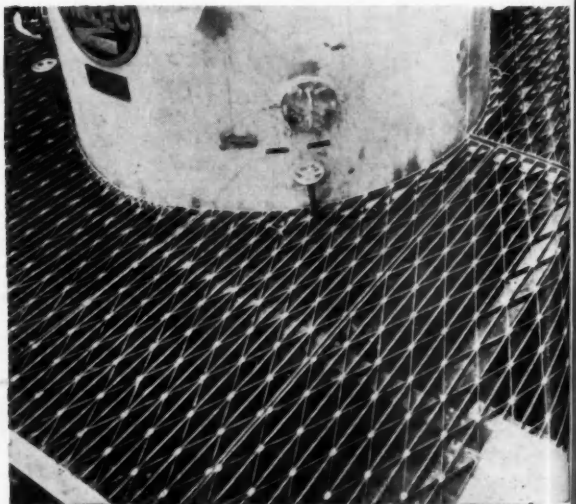

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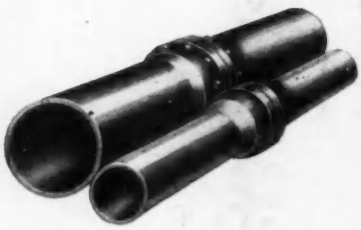
STANTON

Spun Iron Pipes and Flexible Joints



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